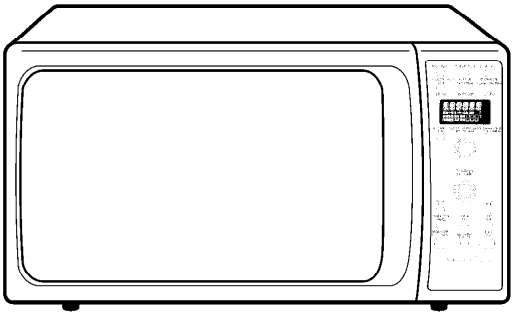
MOD0009237C3

Service Manual

Microwave Oven

NN-C2000P / NN-C2000W



SPECIFICATIONS

Specifications

Power Source:		240 V AC Single Phase, 50 Hz ····· For QPQ, KNQ, MNQ, YNQ models 230 V AC Single Phase, 50 Hz ····· For JPG model 220 V AC Single Phase, 50 Hz ····· For HNE, TNE, KKE models 220-230 V AC Single Phase, 60 Hz ····· For LNK model 220 V AC Single Phase, 50/60 Hz ····· For SNM model
Power Requirement:	Microwave	1,220 W
	Heater	1,800 W
Output:	Microwave	1,000 W: Full Power (IEC 705-88)
	Heater	1,760 W
Microwave Frequency:		2,450 MHz
Timer:		99 min. 99 sec. / 9 hr. 99 min.
Outside Dimensions:		376 mm (H) X 611 mm (W) X 490 mm (D)
Oven Cavity Dimensions:		242 mm (H) X 412 mm (W) X 426 mm (D)
Weight:		Approx. 21 kg
Specifications subject to change without notice.		

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⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

WARNING

* This product should be serviced only by trained, qualified personnel.
This service manual covers products for following markets.
When troubleshooting or replacing parts, please refer to the country identifications shown below for your applicable product specification.

YNQ ····· For Singapore
KNQ ····· For Kuwait, Doha Qatar, Oman, Bahrain, Pakistan
MNQ ····· For Malaysia
QPQ ····· For Australia
HNE ····· For Hong Kong
KKE ····· For U.A.E, Egypt, Iran
TNE ····· For Thailand, Indonesia
LNK ····· For Philippines
JPG ····· For New Zealand
SNM ····· For Saudi Arabia

DANGER OF HIGH VOLTAGE AND HIGH TEMPERATURE (HOT/LIVE) OF THE INVERTER POWER SUPPLY (U)

INVERTER WARNING

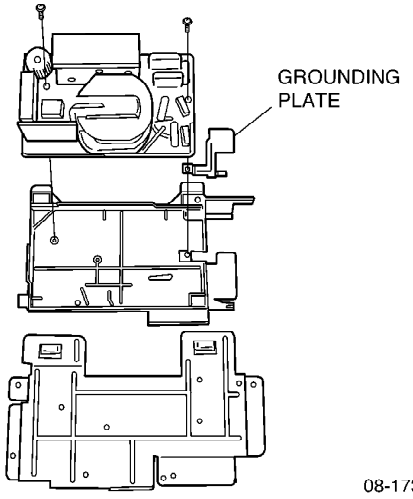
NEW H.V.

DANGER HIGH VOLTAGE

This Inverter board looks like a regular PCB; However, this PCB drives the magnetron tube with extremely high voltage and high current.

IT HAS: 1. Very high voltage and high current circuit.
It functions the same as the high voltage transformer and high voltage capacitor in ordinary microwave ovens.
2. Aluminum heat sink is very hot in high voltages and heat energy.
3. Very high voltage may remain in circuitry even when oven is off. High voltages may remain in the capacitors on the board.

DO NOT: ＊1. Do not touch circuitry because it has very hot (high voltage) circuitry. Even when replacing board, extreme care should be taken to avoid possible electric shock hazards. High voltage may remain in circuit.
＊2. Do not touch aluminum heat sink because it is very hot in high voltage and also very hot in high heat energy.
＊3. Do not try to adjust or tamper preset volume on the Inverter board because it is very dangerous to adjust without proper test equipment.
＊4. Do not test oven while Inverter grounding strip or screws are loose. It is very dangerous to operate the H.V.Inverter Circuit (U) with loose mounting screws or if imporperly grounded.



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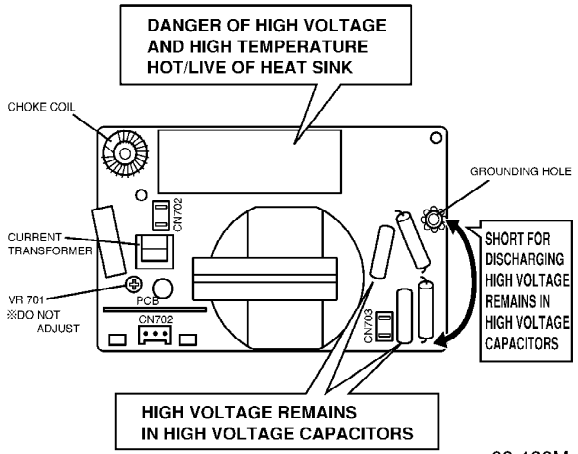
INVERTER POWER SUPPLY DIAGRAM



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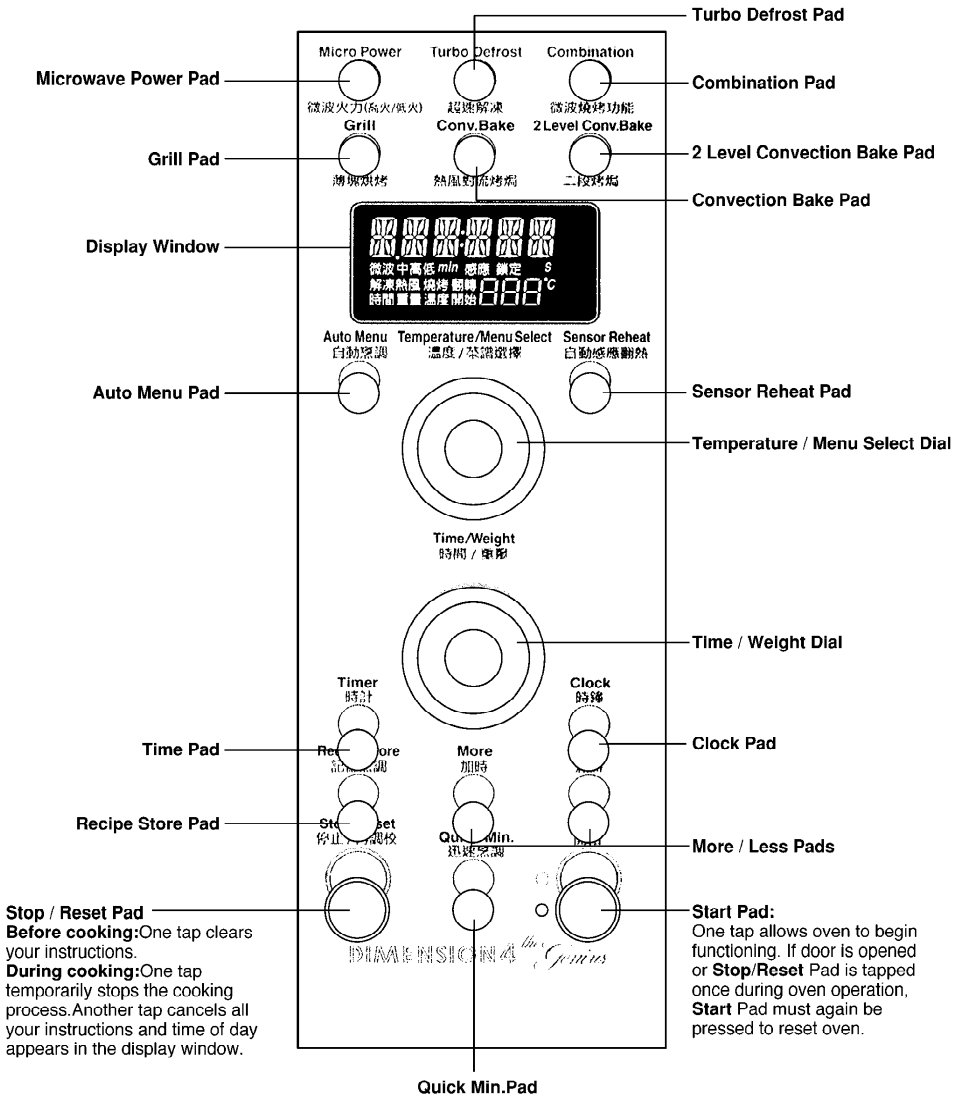
National/Panasonic

1. FEATURE CHART

FEATURE	
Three Stage Cooking	×
Sensor Reheat	×
Auto Cooking	×
Turbo Defrost	×
Convection	×
Combination	×
Grill	×
Child Safety Lock	×
Word Prompting Display	×
Timer/Stand Time	×
Digital Clock	×

2. CONTROL PANEL



3. OPERATION AND DIGITAL PROGRAMMER CIRCUIT TEST PROCEDURE

1. To Set Clock

OPERATION	SCROLL DISPLAY
1. Plug the power supply cord into wall outlet.	WELCOME TO INVERTER COOKING
2. Press **Clock** pad.	✳ −−SET TIME
3. Enter tim of day (TOD) by Turning Time/Weight Knob.	11:25 −−PRESS CLOCK
4. Press **Clock** pad. TOD has now been resistered into the digital programmer circuit and will count up by minutes.	11:25

2. Time Cooking for Two Stage

OPERATION	SCROLL DISPLAY
1. Place a water load in the oven.	
2. Press **Micro Power** button once to set High power. (1st stage)	HIGH −−SET TIME
3. Set for 10 seconds by Turning time knob.	10 SEC −−PRESS START HIGH
4. Press **Micro Power** button 4 times to set Medium power. (2nd stage)	MEDIUM −−SET TIME
5. Set for 1 minute by Turning time knob.	1 00 MIN SEC −−PRESS START MEDIUM
6. Press **Start** button.	MICRO 10 SEC
7. When 1st stage cooking time has elapsed, oven automatically switches to 2nd stage cooking.	MICRO 1 00 MIN SEC
8. When 2nd stage cooking time has elapsed, oven beeps 5 times and shuts off.	ENJOY YOUR MEAL Time of day or colon appears in the display.

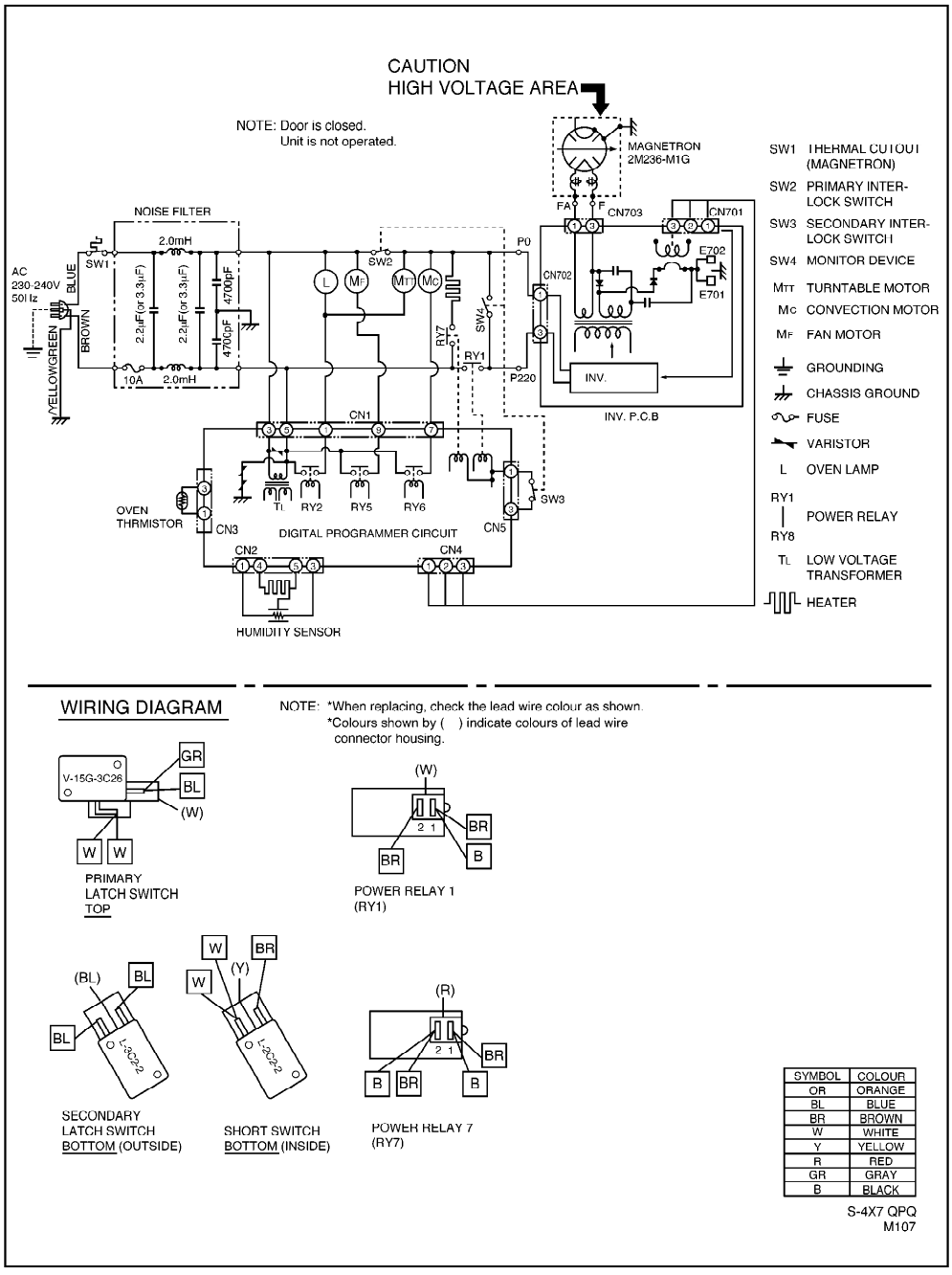
3. Turbo Defrost

OPERATION	SCROLL DISPLAY
1. Press **Turbo Defrost** pad.	TURBO DEFROST −−SET WEIGHT
2. Set the weight for 3 kg by Turning weight knob.	3.0kg −−PRESS START
3. Press **Start** button.	MICRO 45 MIN 52 SEC

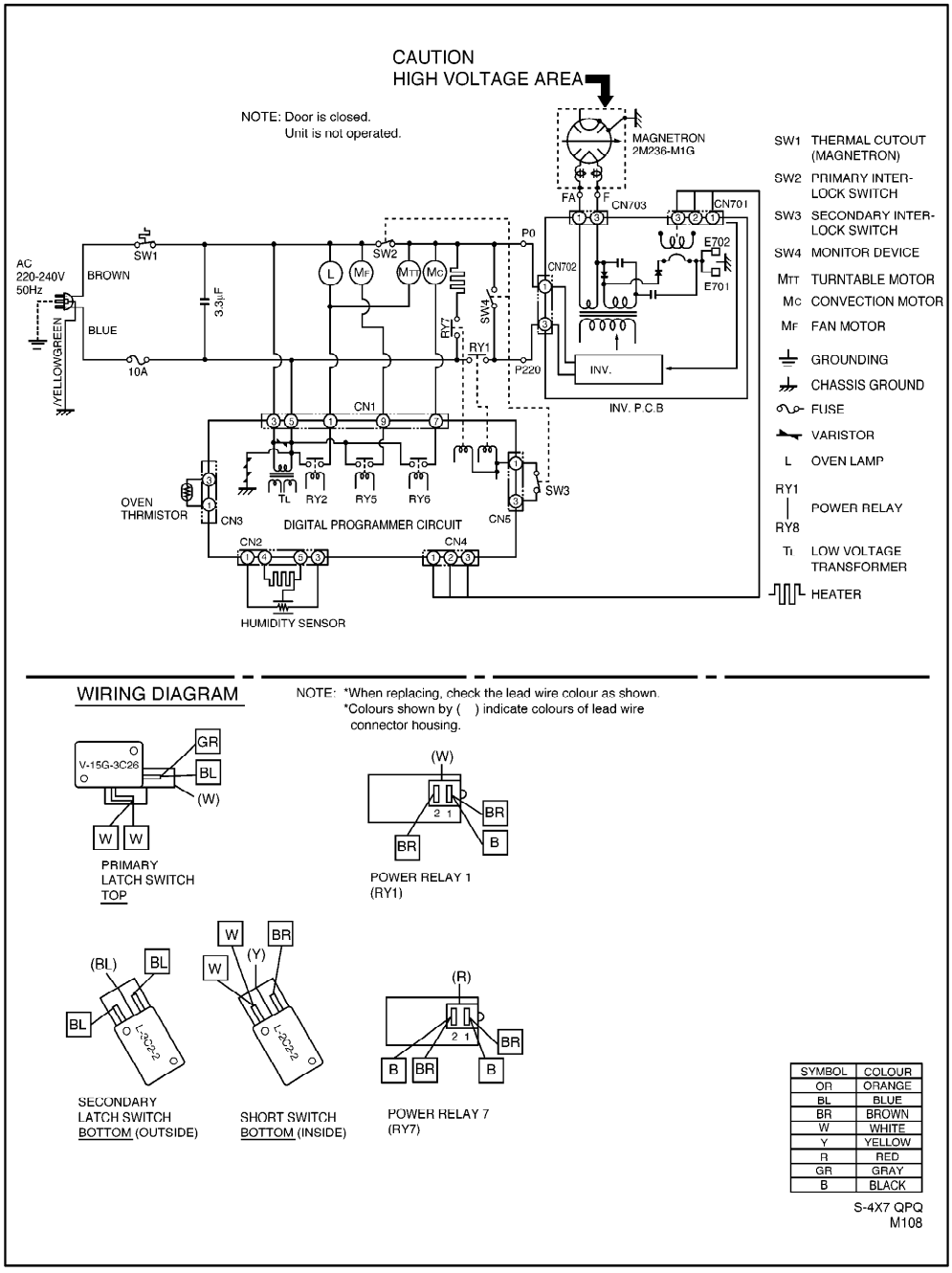
4. Convection Cooking with Preheat

OPERATION	SCROLL DISPLAY
1. Press **Convection** button. 1-2. Set 110°C by Turning temp knob.	110C −−PRESS START
2. Press **Start** button.	CONV P
3. When preheating is completed, oven beeps 3 times.	CONV −−PREHEAT END−−
4. After completion of preheating, be sure to open the door.	110C −−SET TIME
5. Close the door and set convection cooking time for 2 minutes.	2 00 MIN SEC −−PRESS START 110C
6. Press **Start** button.	CONV 2 00 MIN SEC

4. SCHEMATIC DIAGRAM (FOR QPQ, JPG)



5. SCHEMATIC DIAGRAM (FOR MNQ, YNQ, TNE, LNK, SNM, KNQ, KKE)



6. DESCRIPTION OF OPERATING SEQUENCE

6.1. Variable power cooking control

HIGH VOLTAGE INVERTER POWER SUPPLY (U) controls output power by the signal from Digital Programmer Circuit (DPC). Power relay 1 stays on but the inverter drive signal to control it's output power.

NOTE: The ON/OFF time ratio does not correspond with the percentage of microwave power since approximately 2 seconds are required for heating of magnetron filament.

6.2. Turbo weight defrost

When auto weight defrost is selected and the Start Pad is tapped:

1. **The digital programmer circuit determines the power level and cooking time to complete cooking and indicates the operating state in the display window. Table shows the corresponding cooking times for respective serving by categories.**
2. **When cooking time in the display window has elapsed, the oven turns off automatically by a control signal from the digital programmer circuit.**

6.3. Convection/Grill cooking control

The digital programmer circuit controls the ON-OFF time of the heater in order to control oven cavity temperature.

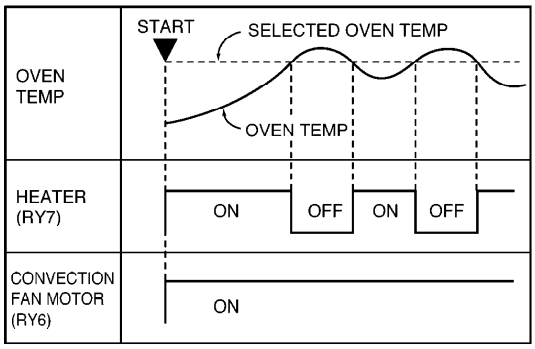
1. **After the start pad is tapped with the desired Bake/Broil program set, an 18V DC signal comes out of the digital programmer circuit and is applied to coil of power relay 7 (RY7).**
2. **When the contacts of power relay 7 close, power source voltage is applied to the heater and the heater turns on.**
3. **When the oven temperature reaches the set temperature, the digital programmer circuit senses the temperature through oven temp sensor and stops supplying an 18V DC signal to the coil of power relay 7 and the heater turns off.**
4. **After the heater turns off, the oven temperature will continue increasing a while and then decrease as shown in Figure. When the oven temperature drops below the set temperature, the digital programmer circuit senses the signal and starts supplying an 18V DC signal to the coil of power relay again.**

NOTE: When Broil feature is selected, oven temperature is determined automatically as shown in Figure.

POWER SETTING	ON-OFF TIME OF POWER RELAY 1 (RY1)	
	ON (SEC)	OFF (SEC)
HIGH	22	0
MEDIUM-HIGH	22	0
MEDIUM	22	0
MEDIUM-LOW	16	6
LOW	9	13
DEFROST	16	6

Auto Weight Defrost

WEIGHT SELECTED	TOTAL DEFROSTING TIME
1.0 kg	14 min. 37 sec.
2.0 kg	30 min. 14 sec.



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6.4. Combination cooking control

Combination cooking is accomplished by microwave and convection cooking being done alternately during one combination cooking cycle. One combination cooking cycle is 22 seconds.

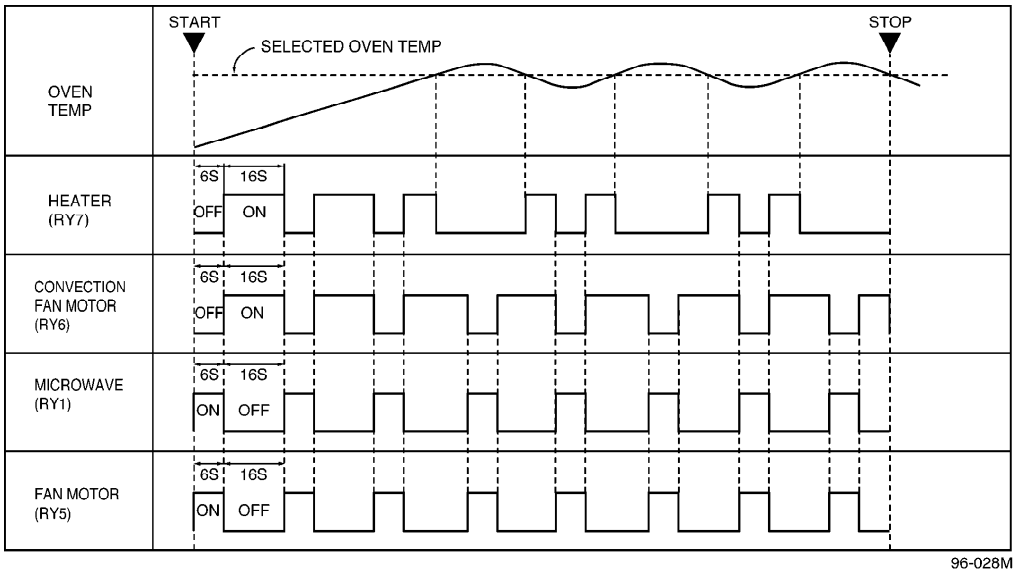
1. **During combination cooking, the digital programmer circuit controls ON-OFF time of both power relay 1 and 7 as shown in Figure.**
2. **When the power relay 1 (RY1) is turned on, heater turns off and after the power relay 1 turns off, power relay 7 turns on.**

NOTE 1: Note that the heater may not be on during a heater on period if the preprogrammed oven temperature has been reached. This is due to the fact that the oven is keeping the preprogrammed oven temperature constant, so of course the heater will only be on when it is needed and off when it is not needed.

NOTE 2: As for temperatures of combination cooking for convection, the temperatures by each program are preprogrammed in the microprocessor as shown in Figure.

Combination Cooking

CATEGORY	MICROWAVE	OVEN TEMP
1	6/16 SEC	150°C
2	6/16 SEC	160°C
3	6/16 SEC	170°C
6	6/16 SEC	230°C



6.5. One touch Auto sensor cooking

Auto sensor cooking is a revolutionary way to cook by microwave without setting a power level or selecting a time. All that is necessary is to select an Auto sensor Program before starting to cook.

Understanding of Cooking

As food cooks, a certain amount of steam is produced. If the food is covered, this steam builds up and eventually escapes from the container. In Auto Sensor Cooking, carefully designed instrument, called the humidity sensor element, senses this escape of steam. Then, based upon the Auto Sensor Program selected, the unit will automatically determine the correct power level and the proper length of time it will take to cook the food.

NOTE: Auto Sensor Cooking is successful with the foods and recipes found in the Auto Sensor Cooking Guide. Because of the vast differences in food composition, items not mentioned in the Cooking Guide should be prepared in the microwave oven using power select and time features. Please consult Variable Power Microwave Cookbook for procedures.

Explanation of the Auto Sensor Cooking process

1) The shaded columns in Figure indicate when the humidity sensor heater is on.

2) During the 30 second period there is no microwave activity. When calculating the T2 time by using the formula below, make sure this 30 seconds is subtracted from the T0 time.

3) T1 time To time - 30 seconds
4) T2 time When the steam escapes from the cooking container placed in the oven, the humidity sensor detects it and the microprocessor calculates the balance of cooking time. This T2 time is then shown in the display and begins counting down.
Balance of cooking time (T2 time)
The balance of cooking time which is called T2 time, can be calculated by the following formula.
T2 time (in sec.) = T1 time × K factor

NOTE: Remember, the T1 time starts after the Start pad is tapped. The coefficient K is programmed into the microprocessor memory and they are listed in the following tables along with the P1 and P2 powers.

NOTE: When "More" or "Less" pad is selected, the K factor varies resulting in T2 time to be increased or decreased.

NOTE: For T2 time of Category Casserole, HEATER operation programmed.

Example of calculating theT2 time
Example 1: If the T1 time is measured to be 2 minutes and 40 seconds, and the Auto Sensor program selected is Sensor Reheat.
T2 = T1 × K
= 2 min. and 40 sec. × 0.3
= 48 sec.

Auto Sensor Cook

Category	P1 Power	P2 Power	K factor Standard
Sensor Reheat	HIGH	M. HIGH	0.3
Steam Frozen Food	M. HIGH	LOW	0.1
Double Boil	M. HIGH	LOW	3.0

7. CAUTIONS TO BE OBSERVED WHEN TROUBLESHOOTING

Unlike many other appliances, the microwave oven is high-voltage, high-current equipment. Though it is free from danger in ordinary use, extreme care should be taken during repair.

CAUTION
Servicemen should remove their watches whenever working close to or replacing the magnetron.

7.1. Check the grounding

Do not operate on a 2-wire extension cord. The microwave oven is designed to be used when grounded. It is imperative, therefore, to make sure it is grounded properly before beginning repair work.

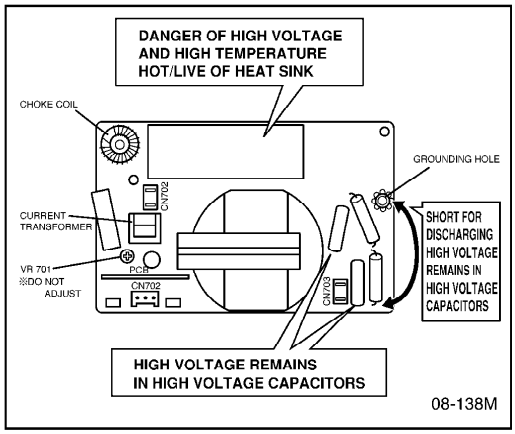
7.2. Inverter Warnings (NEW H.V.)

DANGER OF HIGH VOLTAGE AND HIGH TEMPERATURE (HOT/LIVE) OF THE INVERTER POWER SUPPLY (U)

This High Voltage Inverter Power Supply circuit handles very high voltage and very high current for the magnetron tube. Though it is free from danger in ordinary use, extreme care should be taken during repair. As you can see, it looks like a TV flyback transformer, however the current is extremely large and so danger exists by its high current and high voltages.

The aluminum heat sink is also energized with high voltage (HOT), so do not touch when AC input terminal is connected to the power line because one of the IGBT switching power devices (Collector) is directly connected to the Aluminum heat sink.

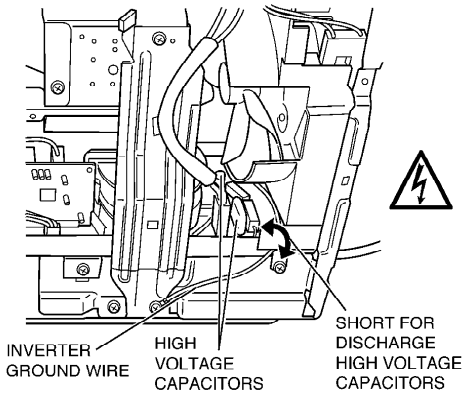
The Aluminum heat sink may be HOT by heat energy; therefore, extreme care should be taken during servicing and replacing.



WARNING OF DISCHARGING HIGH VOLTAGE CAPACITORS

Warning about the electric charge in the high voltage capacitors. For about 30 seconds after the oven is turned off, an electric charge remains in the high voltage capacitors in the inverter power supply circuit board.

When replacing or checking parts, remove the power plug from the outlet and remove air guide cover then short the Inverter high voltage diode terminal to the chassis ground with an insulated handle screwdriver to discharge. Please make sure to touch chassis ground side first then short to the output terminals.



Touch chassis side first then short to the high voltage diode terminal.

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WARNING

There is high-voltage present, with high-current capabilities in the circuits of the primary, and secondary windings, choke coil and heat sink of the Inverter. It is extremely dangerous to work on or near these circuits with oven energized.

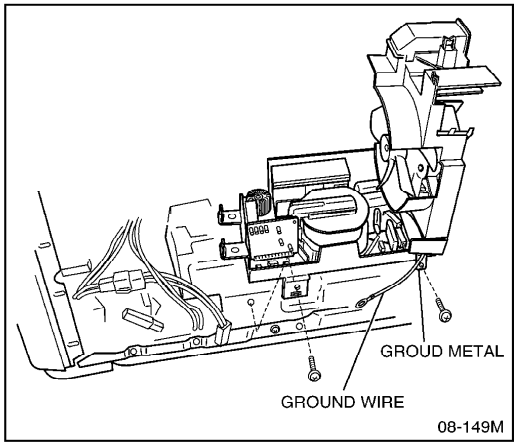
DO NOT measure the voltage in the high voltage circuit including filament voltage of magnetron.

WARNING

Never touch any circuit wiring with your hand nor with an insulated tool during operation.

WARNING OF INVERTER POWER SUPPLY (U) GROUNDING

Check the High Voltage Inverter Power Supply circuit grounding. This High Voltage Inverter Power Supply circuit board must have a proper chassis ground by the grounding bracket to the chassis ground; otherwise, this H.V.Inverter circuit board will expose very high voltage and cause extreme DANGER! Be sure to have proper grounding by the grounding plate and screws.



7.3. When parts must be replaced, remove the power plug from the outlet.

7.4. When the 10A 250V fuse is blown due to the operation of short switch:

WARNING

When the 10A 250V. fuse is blown due to the operation of short switch, you must replace Primary latch switch and short switch. Also replace power relay 1 (RY1) when the continuity check reads shorted contacts (1-2).

1. **This is mandatory. Refer to "Adjustments and Measurement" for these switches.**
2. **When replacing the fuse, confirm that it has the appropriate rating for these models.**
3. **When replacing faulty switches, be sure mounting tabs are not bent, broken or otherwise deficient in their ability to hold the switches.**

7.5. Avoid inserting nails, wire, etc. through any holes in the unit during operation.

Never insert a wire, nail or any other metal object through the lamp holes on the cavity or any other holes gaps, because such objects may work as an antenna and cause microwave leakage.

7.6. Confirm after repair

1. **After repair or replacement of parts, make sure that the screws of the oven, etc. are neither loose nor missing. Microwaves might leak if screws are not properly tightened.**
2. **Make sure that all electrical connections are tight before inserting the plug into the wall outlet.**

CAUTION
MICROWAVE RADIATION
DO NOT BECOME EXPOSED TO RADIATION FROM THE MICROWAVE GENERATOR OR OTHER PARTS CONDUCTING MICROWAVE ENERGY.

IMPORTANT NOTICE
1. The following components have potentials above 250V while the appliance is operated.
   * Magnetron
   * Heat sink of H.V.INVERTER (U)
   * High voltage transformer (H.V.INVERTER (U))
   * High voltage diode (H.V.INVERTER (U))
   * High voltage capacitors (H.V.INVERTER (U))

   Pay special attention on these portions.
2. When the appliance is operated with the door hinge or magnetron fixed incorrectly, the microwave leakage can reach more than 5mW/cm². After repair or exchange, it is very important to check if magnetron and the door hinge is correctly fixed.

8. DISASSEMBLY AND PARTS REPLACEMENT PROCEDURE

8.1. Magnetron

1. **Discharge the high voltage capacitor.**
2. **Remove 2 screws holding magnetron thermal cutout bracket.**
3. **Disconnect 2 high voltage lead wires from magnetron filament terminals.**
4. **Remove 4 screws holding the magnetron.**

NOTE: After replacement of the magnetron, tighten mounting screws properly making sure there is no gap between the waveguide and the magnetron to prevent microwave leakage.

CAUTION
When replacing the magnetron, be sure the antenna gasket is in place.

8.2. Digital programmer circuit (DPC) and membrane key board.

NOTE: Be sure to ground any static electric charge built up on your body, before handling the DPC.

1. **Disconnect all connectors from D.P.C.**
2. **Remove 3 screws holding escutcheon base and slide the escutcheon base upward slightly.**
3. **Remove flat cable of CN5.**
4. **Remove 5 screws holding DPC.**

To replace switch PCB.

5. **Remove 2 knobs.**
6. **Remove 6 screws.**

To replace buttons

1. **Remove escutcheon bracket from escutcheon base by freeing 6 catch hooks on the escutcheon base.**
2. **Replace whole button assembly.**

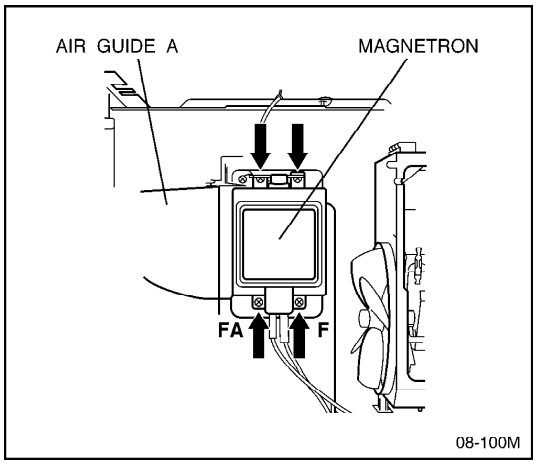
8.3. Low voltage transformer and/or power relays

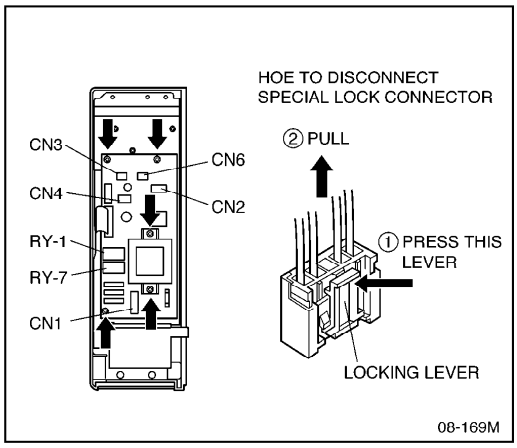
NOTE: Be sure to ground any static electric charge built up on your body before handling the DPC.

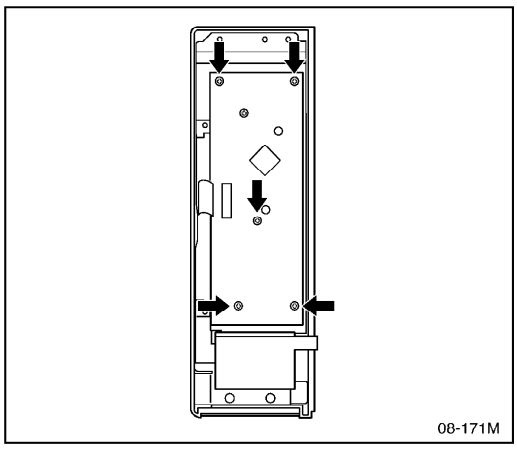
1. **Using solder wick or a desoldering tool and 30W soldering iron, carefully remove all solder from the terminal pins of the low voltage transformer and/or power relays.**

NOTE: Do not use a soldering iron or desoldering tool of more than 30 watts on DPC contacts.

2. **With all the terminal pins cleaned and separated from DPC contacts, remove the defective transformer/power relays and install new transformer/power relays making sure all terminal pins are inserted completely. Resolder all terminal contacts carefully.**







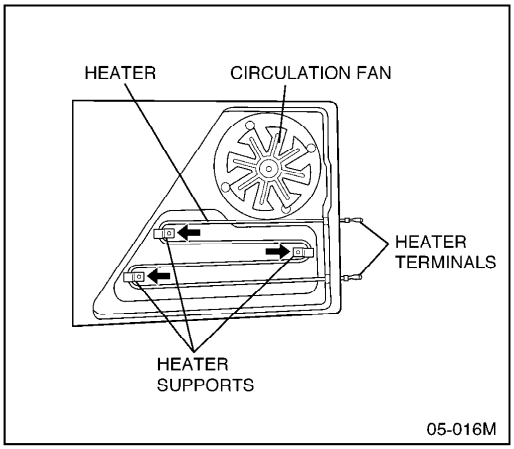
8.4. Fan motor

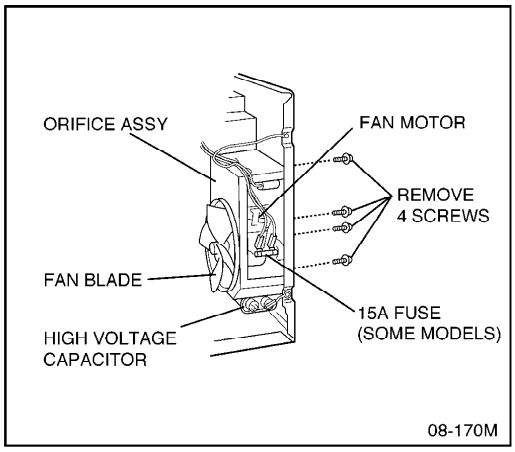
1. Disconnect 2 lead wires from fan motor terminals.
2. Disconnect 2 lead wires from fuse holder terminals. (some models)
3. Remove 4 screws holding fan motor and orifice assy and detach the orifice assy with fan motor from oven assy.

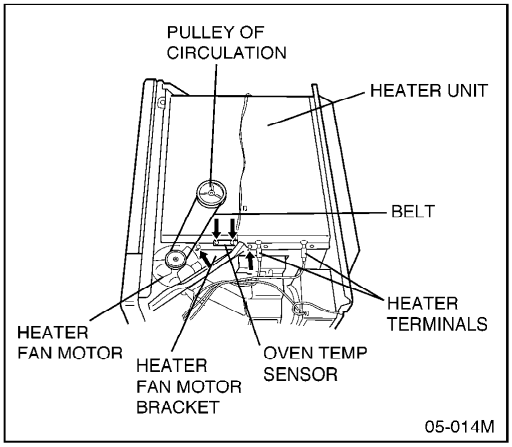
4. Remove fan blade from the fan motor shaft by pulling it straight out.
5. Separate the fan motor from the orifice assy by freeing 2 catch hooks on the orifice assy.

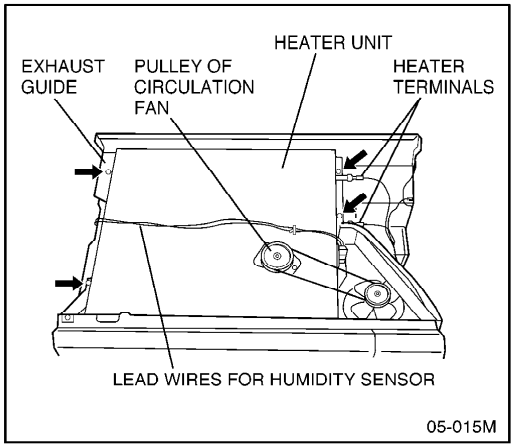
8.5. Heater

1. Remove lead wires from lead wire holders.
2. Remove belt from pulleys of circulation fan.
3. Remove 2 screws holding heater fan motor bracket.
4. Remove 1 screw holding exhaust guide.
5. Remove 2 screws holding oven temp sensor.
6. Disconnect 2 lead wires from heater terminals.
7. Remove 4 screws holding the both sides of heater unit and lift it up carefully.
8. Remove 3 screws holding heater supports and detach the heater.





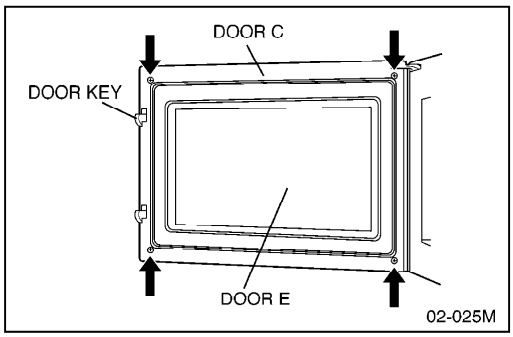




8.6. Door assemble

1. **Open the door and remove 4 screws holding door C.**
2. **Remove the door C from door E by carefully pulling outward starting from upper right hand corner.**
3. **Separate the door A from the door E by freeing 8 catch hooks on the door A.**

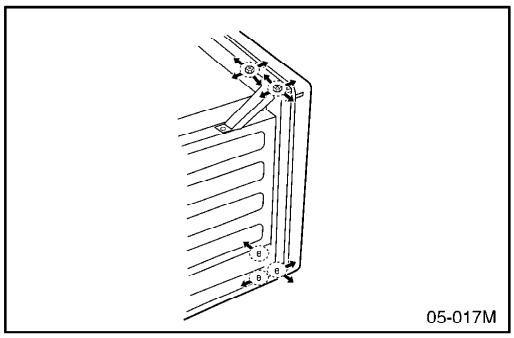
4. Remove door key spring and door key.



After replacement of the defective component parts of the door, reassemble it and follow the instructions below for proper installation and adjustment so as to prevent an excessive microwave leakage.

1. When mounting the door to the oven, be sure to adjust the door parallel to the bottom line of the oven face plate by moving the upper hinge and lower hinge in the direction necessary for proper alignment.

2. Adjust so that the door has no play between the inner door surface and oven front surface. If the door assembly is not mounted properly, microwave may leak from the clearance between the door and oven.

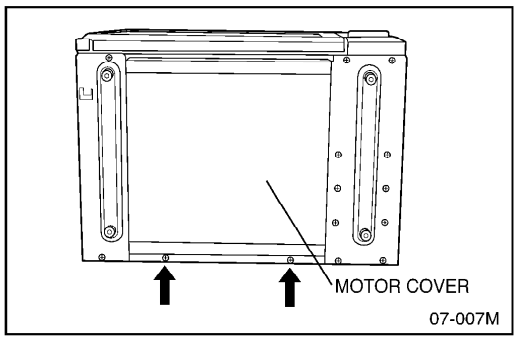


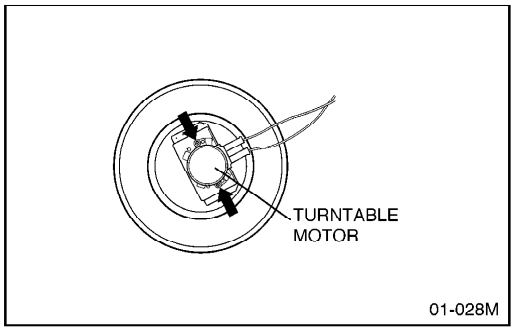
8.7. Turntable motor

1. Remove 2 screws holding motor cover.

2. Disconnect 2 lead wires from turntable motor.

3. Remove 2 screws holding turntable motor.

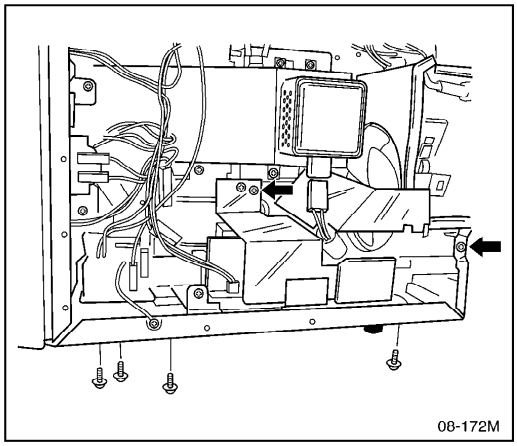


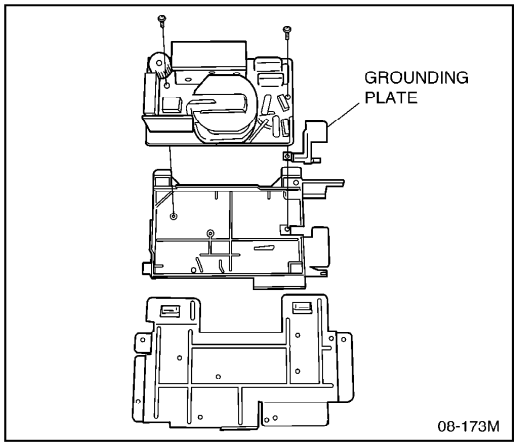


8.8. Inverter PCB

1. Remove 2 screws holding inverter bracket to oven chassis.
2. Remove A screw holding air guide.
3. Remove grounding lead wire.
4. Remove 2 screws holding noise filter PCB. (some models only)
5. Remove all lead wires from inverter PCB.
6. Slide left and take out inverter PCB with brackets.
7. Remove A screw holding inverter PCB to bracket from bottom.
8. Remove 3 screws holding inverter PCB to bracket.
9. Remove inverter PCB from its bracket by releasing several catch hooks.
10. When re-install, make sure to place grounding plate in its place.

Missing grounding is very danger.





9. COMPONENT TEST PROCEDURE

DANGER NEW H.V.

1. High voltage is present at the high voltage terminal of the High Voltage Inverter (U) including aluminum heat sink during any cook cycle.
2. It is neither necessary nor advisable to attempt measurement of the high voltage.
3. Before touching any oven components, or wiring, always unplug the oven from its power source and discharge the high voltage capacitor.

9.1. Primary Latch Switch, Secondary (Secondary Latch Switch and Power Relay 1) Interlocks.

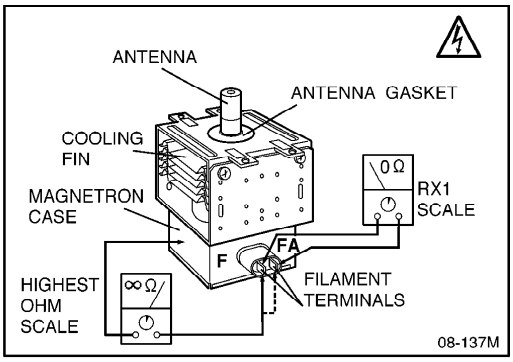
1. **Unplug the lead connectors to Power Relay 1 and verify continuity of the power relay 1 1-2 terminals.**
2. **Unplug lead connectors to Primary Latch Switch and Secondary Latch Switch.**
3. **Test the continuity of switches at door opened and closed positions with ohm meter (low scale).**
   Normal continuity readings should be as follows.

	Door Opened	Door Closed
Primary Latch Switch	∞ Ω (open)	0 Ω (close)
Secondary Latch Switch	∞ Ω (open)	0 Ω (close)
Power Relay 1	∞ Ω (open)	∞ Ω (open)

9.2. Short Switch / Monitor Circuit

1. Unplug lead wires from H. V. Inverter primary terminals.
2. Connect test probes of ohm meter to the disconnected leads which were connected to H. V. Inverter.
3. Test the continuity of short switch with door opened and closed positions using lowest scale of the ohm meter.
   Normal continuity readings should be as follows.

Door Opened	Door Closed
0 Ω	∞ Ω



9.3. Magnetron (NEW H.V.)

Continuity checks can only indicate an open filament or a shorted magnetron. To diagnose for an open filament or shorted magnetron.

1. Isolate magnetron from the circuit by disconnecting the leads.
2. A continuity check across magnetron filament terminals should indicate one ohm or less.
3. A continuity check between each filament terminal and magnetron case should read open.

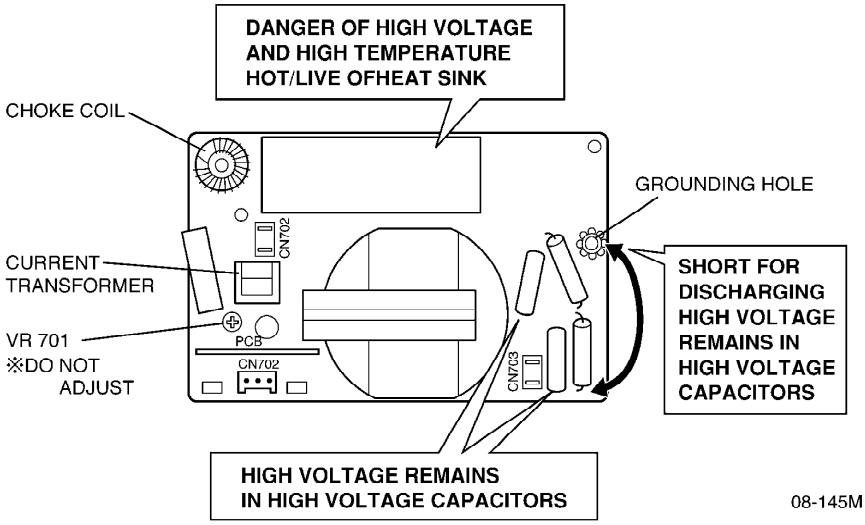
NOTE
Magnetron used for this model is unique type for inverter power supply system. Make sure to use the one as listed in the part list.

9.4. Membrane key board (Membrane switch assembly)

Check continuity between switch terminals, by tapping an appropriate pad on the key board. The contacts assignment of the respective pads on the key board is as shown in digital programmer circuit.

9.5. Inverter Power Supply (U) (NEW H.V.)

DO NOT try to REPAIR this H. V. Inverter power supply (U).
Replace as whole H. V. Inverter (U) Unit.
Refer to warning on page 2.



9.6. Inverter Power Supply (U) (NEW H,V,)

DANGER HIGH VOLTAGE
Test 1

1. Place 1 liter of water load into oven cavity.

2. Unplug 2 pin H. V. lead wire connector CN703 from magnetron tube.

3. Program oven at High power for 1 minute and press start.
A. After approx. 23 seconds, oven stops.
B. During oven operation, input current is approx. at 0.5 to 1.0A . If input current is OK, please proceed to test 2.

	INPUT AMPARE	SYMPTOM
Unplug CN703	0.5 to 1A	Oven stops in 23 seconds after started.

Test 2
Continued from Test 1

1. Unplug 3 pin connector, CN701 CN703 remaisn unplug.

2. Set oven at High power for 1 minute and start.
A. After approx. 3 seconds, oven.
B. During oven operation, input current should be less than 0.4A.

	INPUT AMPARE	SYMPTOM
Unplug CN701	less than 0.4A	Oven stops in 3 seconds after started.

If both 1 and 2 are OK, the Inverter Power Supply (U) can be determined OK.

9.7. Steam Sensor and Digital Programmer Circuit

In order to determine if the steam sensor function of the digital programmer circuit is in working order or not, do the following test.

1. **Place a water load (150 cc) in the oven.**
2. **Tap Sensor Reheat pad.**
3. **Tap Start Pad.**
4. **Steam Sensor detects steam about 1.5 to 4 minutes after the Start Pad is tapped.**
5. **T1 time cooking automatically switches to remaining time cooking (T2).**
6. **The remaining cooking time (T2) appears in display window. If the following cooking time appears, Steam Sensor function is normal.**

T1 TIME	T2 TIME (Remaining cooking time)
1 Min. 30 Sec. ~ 4 Min.	18 Sec. ~ 48 Sec.

9.8. Oven temp sensor thermistor

This sensor monitors the heat produced by the heater circuit and maintains the oven temperature the user had selected. Normal room 10°C to 30°C. The reading across the oven sensor thermistor should be within 100K ohm to 300K ohm when reading in an area with the 50°F to 90°F room temperature range.
If the resistance reading is out of the range stated here, the sensor is detective and must be replaced.
NOTE 1: When measuring resistance disconnect the 3-pin connector (CN6) from the DPC otherwise a false reading may be indicated.
NOTE 2: If checking an oven sensor thermistor just after the microwave oven has been operating, the sensor of course won't be room temperature. In this case the sensor must be removed and allowed to cool down to the 10°C to 30°C range.

9.9. Humidity Sensor and digital programmer circuit

CAUTION
Do not touch any parts of the circuitry on the digital programmer circuit since static electric discharge may damage this control panel.
Always ground yourself while working on this panel to discharge any static charge built up on your body.

1. **Check across sensor heater terminals. Normal cold resistance should read approx. 4.5 ohm.**

2. In order to determine if the Auto/Humidity Sensor function of the digital programmer circuit is in working order or not, do the following test.

A. Place a water load in the oven.

B. Unsolder 2 black wires connected to sensor terminals.

C. Tap Sensor Reheat Pad to set auto sensor cooking and tap Start Pad.

D. About 10 seconds after Start Pad is touched, short 2 black wires for 5 seconds and then remove them. Before shorting the 2 black wires you can watch the sensor heater glow red.

E. Approx. 75 seconds after the Start Pad is pressed (T0 TIME), short the 2 black wires again.

F. "AUTO" should disappear in display window and following digits (see chart) should appear indicating **balance of cooking time (T2 TIME). The time should start to count down and oven should shut off when the time has elapsed.

* T0 TIME	** T2 TIME (balance of cooking time)
70 sec. ~ 80 sec.	21 ~ 24 sec.

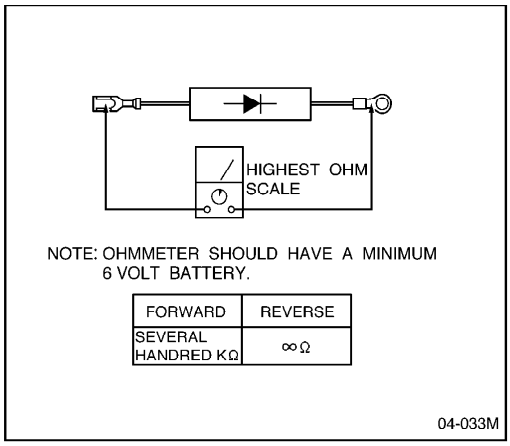
The Auto Sensor function in the digital programmer circuit is working in order if above condition is obtained.

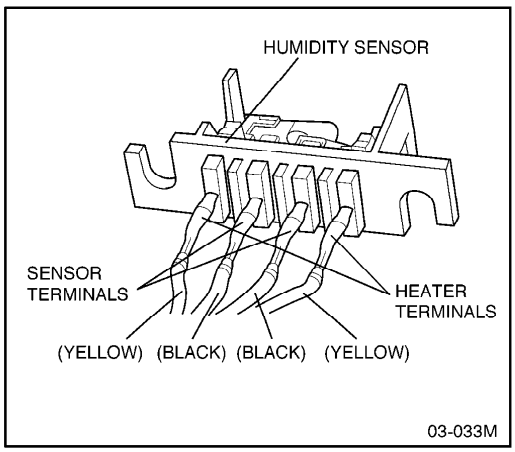
9.10. Oven temp sensor thermistor

This sensor monitors the heat produced by the heater circuit and maintains the oven temperature the user had selected. Normal room temperature, especially in a kitchen can vary anywhere from 10°F to 30°F. The reading across the oven sensor thermistor should be within 100K ohm to 500K ohm when reading in an area within the 10°F to 30°F room temperature range. If the resistance reading is out of the range stated here, the sensor is detective and must be replaced.

NOTE 1: When measuring resistance disconnect the 4-pin connector (CN3) from the DPC otherwise a false reading may be indicated.

NOTE 2: If checking an oven sensor thermistor just after the microwave oven has been operating, the sensor of course won't be room temperature. In this case the sensor must be removed and allowed to cool down to the 50°F to 90°F range.





10. MEASUREMENTS AND ADJUSTMENTS

10.1. Adjustment of Primary latch switch, Secondary latch switch and short switch

1. When mounting Primary latch switch, Secondary latch switch and short switch to door hook assembly, mount the Primary latch switch, the Secondary latch switch and the short switch to the door hook assembly as shown in table.

NOTE: No specific adjustment during installation of Primary latch switch, Secondary latch switch and short switch to the door hook is necessary.

2. When mounting the door hook assembly to the oven assembly, adjust the door hook assembly by moving it in the direction of arrow in table so that the oven door will not have any play in it. Check for play in the door by pulling the door assembly. Make sure that the latch keys move smoothly after adjustment is

completed. Completely tighten the screws holding the door hook assembly to the oven assembly.

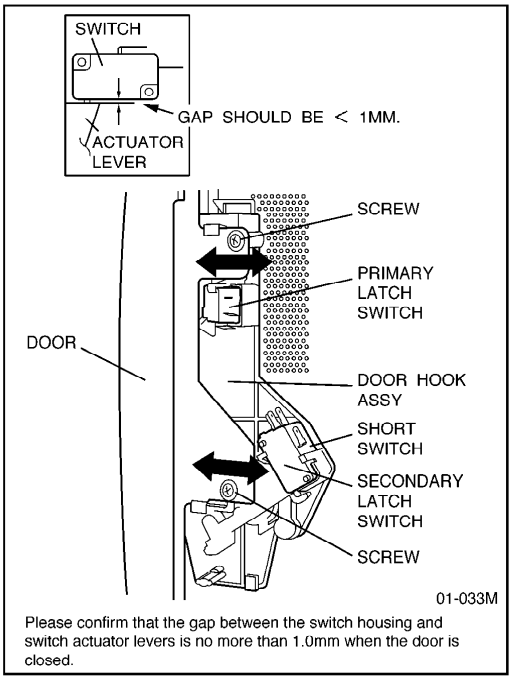
3. Reconnect the short switch and check the continuity of the monitor circuit and all latch switches again by following the components test procedures.

10.2. Measurement of microwave output

The output power of the magnetron can be determined by performing IEC standard test procedures. However, due to the complexity of IEC test procedures, it is recommended to test the magnetron using the simple method outlined below.
Necessary Equipment:
***1 liter beaker *Glass thermometer**
***Wrist watch or stopwatch**

NOTE: Check the line voltage under load. Low voltage will lower the magnetron output. Take the temperature readings and heating time as accurate as possible.

1. Fill the beaker with exactly one liter of tap water. Stir the water using the thermometer and record the beaker~s temperature (recorded as T1).
2. Place the beaker on the center of glass cook plate. Set the oven for High power and heat it for exactly one minute.
3. Stir the water again and read the temperature of the beaker (recorded as T2).
4. The normal temperature rise at High power position for each models is as shown in table.



Please confirm that the gap between the switch housing and switch actuator levers is no more than 1.0mm when the door is closed.

TABLE (1ℓ-1 min. test)

RATED OUTPUT	TEMPERATURE RISE
1000 W (IEC705-88)	Min. 8.6°C

11. TROUBLESHOOTING GUIDE (NEW H.V.)

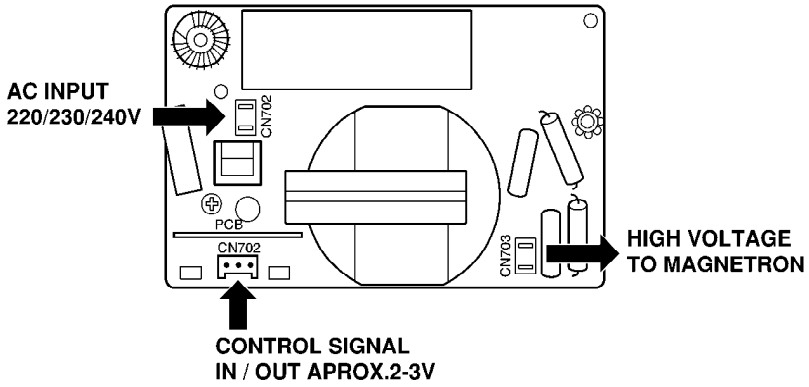
DANGER HIGH VOLTAGES

1. **DO NOT RE-ADJUST PRESET VOLUME on the H.V.Inverter (U).** It is very dangerous to repair or adjust without sufficient test equipment because this circuit handles very large current with very high voltage. Off alignment of inverter board operation will be dangerous.
2. Ensure proper grounding before checking for trouble.
3. Be careful of the high voltage circuitry, taking necessary precautions when troubleshooting.
4. Discharge high voltage remains in the H. V. Inverter (U).
5. When checking the continuity of the switches or the H.V.Inverter, disconnect one lead wire from these parts and then check continuity with the AC plug removed. To do otherwise may result in a false reading or damage to your meter. When disconnecting a plastic connector from a terminal, you must hold the plastic connector instead of the lead wire and then disconnect it, otherwise lead wire may be open or the connector cannot be removed.
6. Do not touch any parts of the circuitry on the digital programmer circuit, since static electric discharge may damage this control panel. Always touch yourself to ground while working on this panel to discharge any static charge in your body.
7. 220/230/240V AC is present on the digital programmer circuit (Terminals of power relay's and primary circuit of Digital Programmer Circuit. When troubleshooting, be cautious of possible electrical shock hazard.

Before troubleshooting, operate the microwave oven following the correct operating procedures in the instruction manual in order to find the exact cause of any trouble, since operator error may be mistaken for the oven's malfunction.

(Trouble 1) Oven stops operation during cooking

	SYMPTOM	CAUSE	CORRECTIONS
1.	Oven stops in 3 seconds after pressing start pad	No 120V AC is supplied to H.V.Inverter (U) CN702 terminals	1. Latch Switch 2. Power relay RY-1 3. Loose lead wire connector CN702
	Oven stops in 23 seconds after pressing start pad	H.V.Inverter (U) operates by the control signals from DPC but magnetron is not oscillating	1. Magnetron 2. Loose lead wire connector CN701, CN703
	Oven stops in 10 seconds after pressing start pad (Auto sensor cooking)	Steam sensor circuit is not functions	1. Steam sensor 2. DPC 3. Loose wiring connector CN2
	Oven stops in 60 seconds after pressing start pad	Oven temperature sensor circuit is not functions	1. Oven temp. sensor 2. Loose wiring CN5
2.	Oven stops in random time after pressing start pad	Most probably loose connection of connectors or door latch mechanizm is not adjusted properly	1. Allign door, Door Latch Switches 2. Loose wiring connectors



08-161M

(Trouble 2) Other troubles

	SYMPTOM	CAUSE	CORRECTIONS
1.	Oven is dead. Fuse is OK. No display and no operation at all.	1. Open or loose lead wire harness 2. Open thermal cutout 3. Defective DPC	Check fan motor when thermal cutout is defective.
2.	No display and no operation at all. Fuse is blown.	1. Shorted lead wire harness 2. Defective primary latch switch (NOTE 1) 3. Defective short switch (NOTE 1) NEW H.V. ⚠ 4. Defective H.V.Inverter power supply (U) Refer to component test procedure	Check adjustment of primary, secondary latch switch and short switch including door. Refer to inverter PCB Troubleshooting
		NOTE 1: All of these switches must be replaced at the same time. (Refer to adjustment instructions.) Check continuity of power relay 1's contacts (between 1 and 2) and if it has continuity, replace power relay 1 also.	
3.	Oven does not accept key input (Program).	1. Key input is not insequence 2. Open or loose connection of membrane key pad to DPC (Flat cable) 3. Shorted or open membrane key board 4. Defective DPC	Refer to operation procedure. Refer to DPC troubleshooting.
4.	Oven lamp and fan motor turn on when oven is plugged in with door closed.	1. Misadjustment or loose wiring of secondary latch switch 2. Defective secondary latch switch	Adjust door and latch switches.
5.	Timer starts countdown but no microwave oscillation. (No heat while oven lamp and fan motor turn on)	1. Off-alignment of latch switches 2. Open or loose connection of high voltage circuit especially magnetron filament circuit NOTE: Large contact resistance will bring lower magnetron filament voltage and cause magnetron to have lower output and/or be intermittent. 3. Defective high voltage component NEW H.V. ⚠ H.V.Inverter (U) Magnetron 4. Open or loose wiring of power relay 1 5. Defective primary latch switch 6. Defective power relay 1 or DPC	Adjust door and latch switches. Check high voltage component according to component test procedure and replace if it is defective. Refer to DPC troubleshooting.
6.	Oven can program but timer does not start countdown.	1. Open or loose wiring of secondary latch switch 2. Off-alignment of secondary latch switch 3. Defective secondary latch switch	Adjust door and latch switches.
7.	Microwave output is low. Oven takes longer time to cook food.	1. Decrease in power source voltage 2. Open or loose wiring of magnetron filament circuit (Intermittent oscillation) 3. Aging change of magnetron	Consult eletrician.
8.	Turntable motor turns on when door is opened.	1. Shorted primary latch switch	
9.	Loud buzzing noise can be heard.	1. Loose fan and fan motor	
10.	Turntable motor does not rotate.	1. Open or loose wiring of turntable motor 2. Defective turntable motor	
11.	Heater does not turn on.	1. Defective heater 2. Defective power relay 4 (RY4) 3. Defective DPC	

(Trouble 3) Trouble related Digital programmer circuit

STMPTOM	STEP	CHECK	RESULT	CAUSE/CORRECTIONS
No display when oven is first plugged in	1	Fuse resistor R28 1Ω	Normal	STEP 2
			Open	Shorted circuit of IC-10
	2	Q10 emitter (Output terminal)	Abnormal	Q10
			Normal ≒ 5V	→ IC-1, CX320, DISPLAY
No key input	1	Membrane switch continuity	Abnormal	Membrane switch
			Normal	IC-1
No beep sound	1	IC-1 pin 8 voltage	Abnormal	IC-1
			Normal	BZ, IC-220
Power relay A (RY-2) does not turn on even though the program has been set and the start pad is tapped	1	IC-1 pin 41 voltage while operation	Abnormal	IC-1
			Normal ≒ 5V	→ Step 2
	2	Short circuit between pin 8 and pin 12 of IC-220	Still not turn on	RY-2
			RY-2 turns on	IC-220
No microwave oscillation at any power setting	1	IC-1 pin 9 voltages while operation at high power	Abnormal	IC-1
			Normal 5 ··· ≒ 5V	→ Step 2
	2	Q220 transistor	Abnormal	Q220
			Normal	IC-220, RY-1
Dark or unclear display	1	Replace display and check operation	Normal	DISPLAY
			Abnormal	IC-1
Missing or lighting of unnecessary segment	1	Replace IC-1 and check operation	Normal	IC-1
			Abnormal	DISPLAY

(Trouble 4) Inverter circuit

Inverter PCB Repair Procedures

Warning for High Voltages!

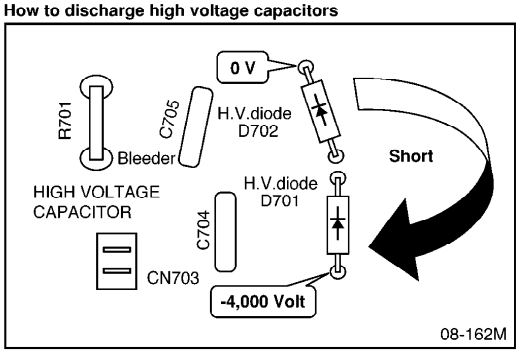
1. Unplug oven when removing outer cabinet
2. Never touch inverter PCB with oven plugged in **inverter PCB handling over 7,000V and it is very danger!**
3. Heat sink is alsoenergized with High Voltages!
4. Discharge high voltage before touching circuitry
5. When testing inverter PCB, completely install it into oven, put outer cabinet and make proper ground.

1. Discharge high voltage before touching Inverter PCB.

1. Unplug oven and leave it for more than 30 seconds before removing outer cabinet.

2. Use insulated lead wire to short across D701 Anode to D702 Cathode or short across magnetron filament terminals to the chassis ground. Please refer to service manual for detail of the specified model.

How to discharge high voltage capacitors



2. Remove inverter PCB from oven before troubleshooting.
Refer to related service manual for inverter PCB removal.

1. Visual check:

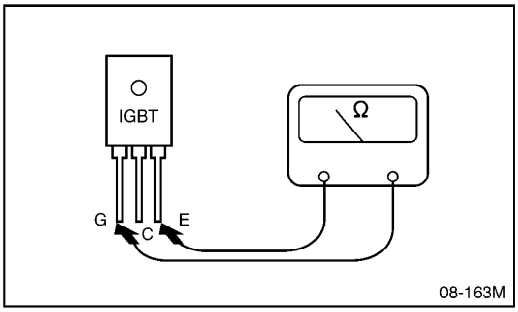
A. PCB board: Any crack on board, burnt printed copper foil pattern? Any cockroach, bugs excrements, any mark of wet?

B. Components: Any damaged components? Any burnt, broken or missing?

3. Check component by circuit tester.

Make sure remove inverter PCB when continuity check
Do not test component when inverter PCB is installed

How to check semi conductor IGBT

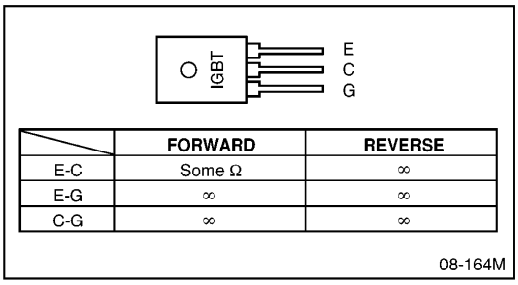


1. How to check power transistors (Q701, Q702). To measure, suck a solder from its legs completely unless faulse reading may observe and mislead a troubleshooting. Measure across pins between E-C, E-G, C-G, E-black lead, C-red lead of tester should be infinite and may have some reading in reverse, it is normal. Refer to attached table for normal reading.

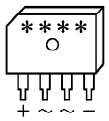
2. DB701 Diode Bridge

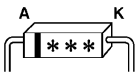
3. C704, C705 High voltage Capacitors. D702 and C705, D701 and C704 are parallel connected therefore, remove component to measure when diode is shorted.

4. D701, D702 High voltage Diodes



	FORWARD	REVERSE
E-C	Some Ω	∞
E-G	∞	∞
C-G	∞	∞

		FORWARD	REVERSE
	~ − +	Some Ω	∞
	~ − −	Some Ω	∞
	~ − ~	∞	∞
	+ − −	Some Ω	∞

BETWEEN TERMINALS	FORWARD	REVERSE
A-K  INSIDE OF HV. DIODE	∞ Infinite Circuit tester employed lower voltage battery Several k ohm to several hundred k ohm will be observed Circuit tester shold employed more than 9V battery	∞ Infinite It does not matter by internal battery voltage

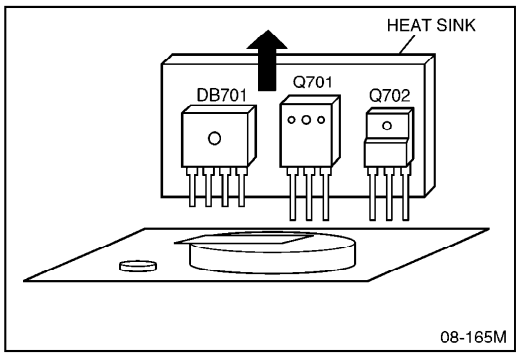
4. How to replace power transistors Q701, Q702 and Bridge Diode DB701.

1. To remove Q701, Q702 and DB701 unsolder their legs first, next remove a screw that holding the heatsink onto the PCB then dtach the heatsink as shown below.
Service Hints: For easy solder removal, use one soldering iron to heat a solder and use solder sucker iron to suck solder.

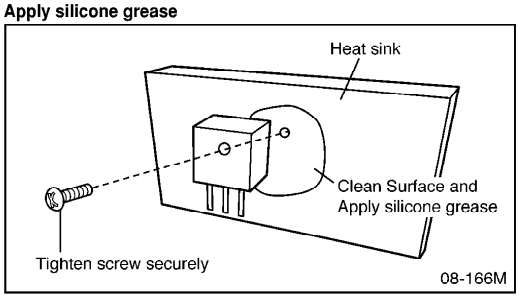
2. Make sure to replace both Q701 and Q702 at a time with the same maker.

3. Make sure to apply heat conduction grease between transistor and heat sink.

4. NO DUST SHOULD CAUGHT between heat sink and power transistor unless if causes looseness of heat conduction and insufficient cooling to blow components.



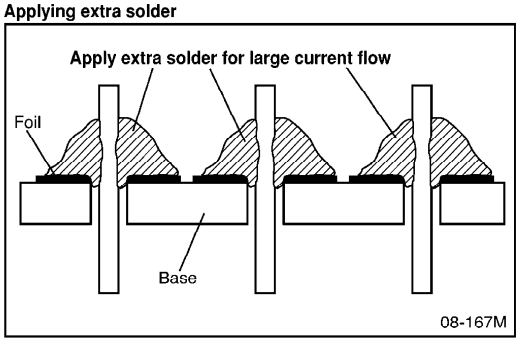
Apply silicone grease



5. Screw must be tighten securely.

6. Install the heatsink onto the PCB by a screw and make sure to apply extra solder between legs and PCB pattern so that it's able to flow 15A or more main current.

Applying extra solder



7. Apply extra solder onto Q701 and Q702 legs and printed foil pattern to be able to hold main large current of more than 15A.

Service hint:

For easy removal of solder, apply some solder first than suck it all.

8. How to test repaired Inverter PCB.

WARNING:

1. Do not test Inverter PCB with using any extention cable Open gounding of inverter PCB is so DANGER.

2. Make sure to check no Bridge solder nor cold solder joint.

1. Install Inverter PCB into oven with screws securely, plug in CN701, CN702 and CN703.

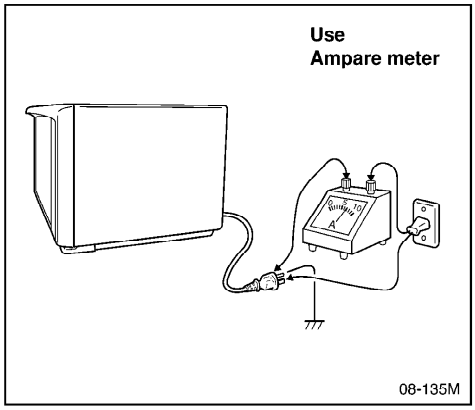
2. Insert AC plug through the Amper meter with specified voltage.
NOTE: Current will be changed by the input AC voltage.

3. Operate the oven at High power setting for 1 minute.

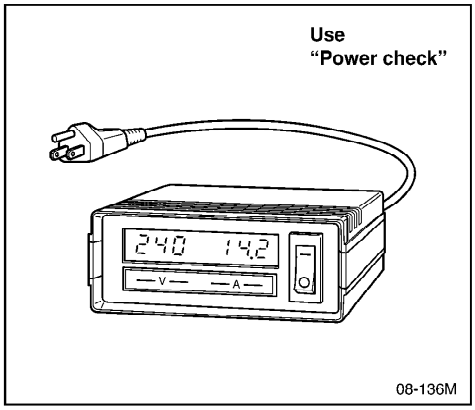
4. Read input current which should be within oven specification.
NOTE: Input current will be decreased after a certain cooking period.

5. Adjustment is not necessary when replacing transistors
You may adjust the preset volume control VR701 to meet the

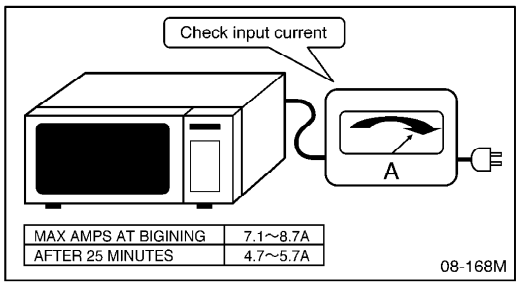
specified input current when Transformer is replaced.

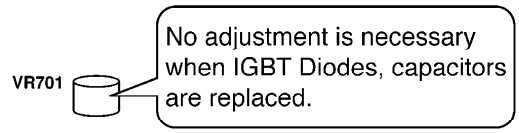


OR



How to test oven





Preset Volume control

NOTE: WHEN TRANSFORMERS OR IC WAS REPLACED MAKE SURE ADJUST VOLUME FOR PROPER INPUT AMPARES.

12. HOW TO CHECK THE SEMICONDUCTORS USING AN OHM METER

Diode

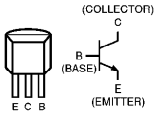
	FORWARD	REVERSE
A-K	SMALL	∞

Transistor

NPN Transistor

2SC·····

2SD·····

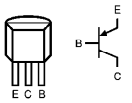


	FORWARD	REVERSE
B-E	SMALL	∞
B-C	SMALL	∞
C-E	∞	∞

PNP Transistor

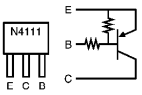
2SA·····

2SB·····



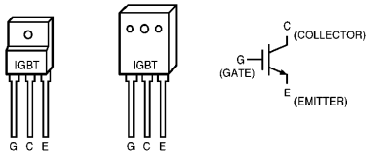
	FORWARD	REVERSE
B-E	SMALL	∞
C-B	SMALL	∞
C-E	∞	∞

Digital Transistor
PNP Transistor



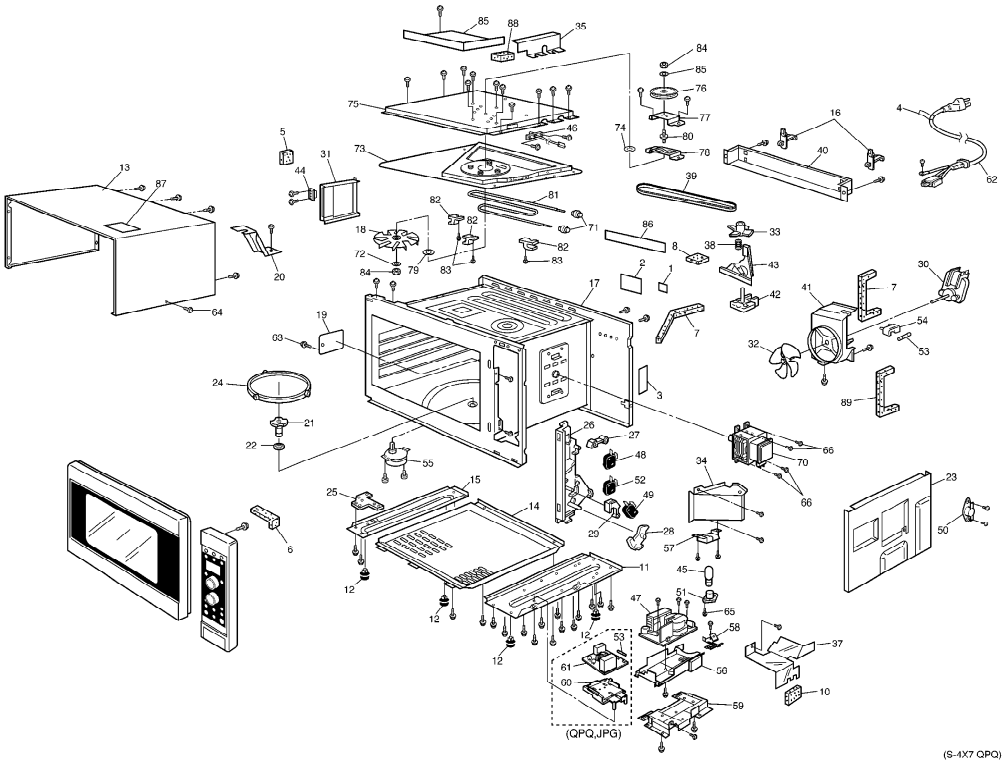
	FORWARD	REVERSE
E-B	10kΩ ~ 30kΩ	10kΩ ~ 30kΩ
C-B	50kΩ ~ 90kΩ	∞
C-E	40kΩ ~ 80kΩ	∞

IGBT
(INSULATED GATE BIPOLAR TRANSISTOR)



	FORWARD	REVERSE
E-C	SMALL	∞
E-G	∞	∞
C-G	∞	∞

13. EXPLODED VIEW AND PARTS LIST



14. PARTS LIST

When ordering replacement part(s) please use part number(s) shown in this parts list. Do not use description of the part.

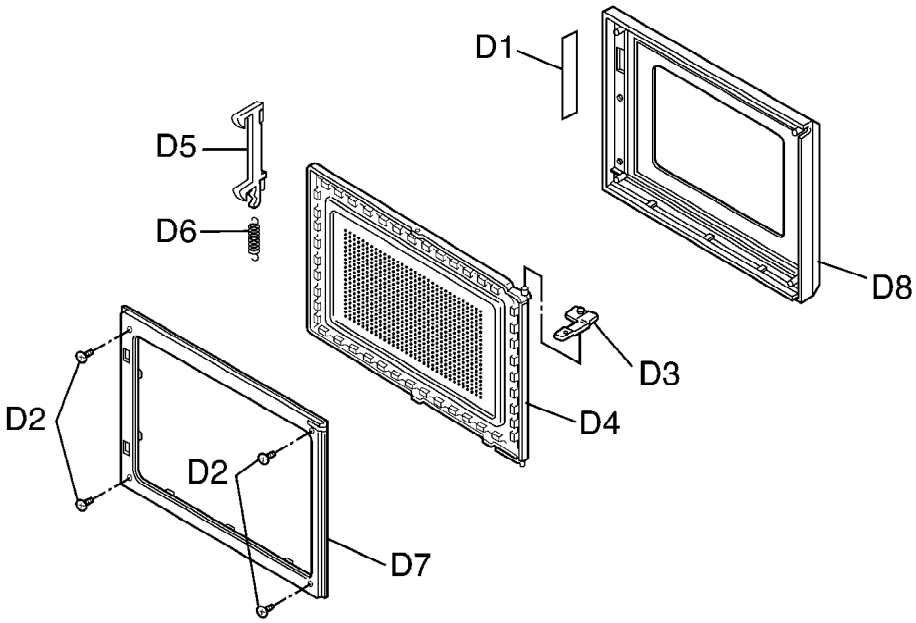
Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.
Alphabet marks in Remarks colums (l. e. HNE etc.) indicate parts applicable to only specified country models as follows.
HNE: For Hong Kong, JPG: For New Zealand, KKE: For U.A.E., Egypt, Iran,
KNQ: For Kuwait, Doha, Qatar, Oman, Baharain, Pakistan, LNK: For Philippines,
MNQ: For Malaysia, QPQ: For Australia, SNM: For Saudi Arabia,
TNE: For Thailand, Indonesia, YNQ: For Singapore
Parts without these marks can be used for all models.

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
1	ANE00057J0XN	EARTH LABEL	1	NN-C2000P TNE
2	A00065460JP	CAUTION LABEL	1	
2	A00065540MN	CAUTION LABEL	1	NN-C2000P YNQ
3	ANE0033730GN	FUSE LABEL	1	NN-C2000P
4	ANE0239L00XN	CORD LABEL	1	NN-C2000P KKE/KNQ/SNM
5	ANE0902000CA	CUSHION RUBBER A	1	
6	ANE0921000BK	CUSHION RUBBER C	1	
7	ANE0924000AQ	CUSHION RUBBER C	1	
7	ANE0924000AQ	CUSHION RUBBER C	1	
8	ANE0922000DD	CUSHION RUBBER C	1	
9	ANE0902000AV	CUSHION RUBBER A	1	
10	ANE0924000GE	CUSHION RUBBER C	1	
11	A10014X00AP	BASE	1	
12	ANE1008-3W0	RUBBER FOOT	4	
12	ANE1008-3W0	RUBBER FOOT	4	
12	ANE1008-3W0	RUBBER FOOT	4	
12	ANE1008-3W0	RUBBER FOOT	4	
13	A10094X70GMN	CABINET BODY	1	NN-C2000P
13	A10094X70HQP	CABINET BODY	1	NN-C2000W
14	A10266660QP	BASE C	1	
15	A11294X00AP	BASE B	1	
16	A11406660QP	STOPPER	2	
16	A11406660HMK	STOPPER	2	NN-C2000P YNQ
17	A200A4X00AP	OVEN	1	⚠
18	ANE22392L0AP	CIRCULATION FAN	1	
19	A20554X00AP	COVER	1	
20	A20764X00AP	REINFORCE BRACKET C	1	
21	A21315870GP	PULLEY SHAFT	1	
22	ANE2177-F80	WASHER	1	
23	A22365450AP	RIGHT HEATER PANEL	1	
24	A290D4J00XN	ROLLER RING (U)	1	
25	A30076660QP	LOWER HINGE	1	⚠
26	A3020-1200	DOOR HOOK A	1	⚠
27	A3136-1200	HOOK SPACER A	1	
28	A31374650AP	HOOK SPACER B	1	
29	A31384650AP	HOOK SPACER C	1	
30	A400A5500QP	FAN MOTOR	1	NN-C2000P HNE/KKE/KNQ/MNQ/SNM/TNE/YNQ NN-C2000W (24.8V
30	A400A4000LN	FAN MOTOR	1	NN-C2000P LNK (26W)
31	A400K5040AQ	EXHAUST GUIDE	1	
32	ANE40086W0AP	FAN	1	
33	A40085020AQ	FAN	1	

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
34	A40256660QP	AIR GUIDE A	1	
35	A40264X00AP	AIR GUIDE B	1	
36	A40306660QP	AIR GUIDE D	1	
37	A40474X00AP	AIR GUIDE E	1	
38	ANE4057-F50	SPRING	1	
39	A40606660QP	BELT	1	
40	A41206660QP	EXHAUST COVER	1	
41	A41446660SN	ORIFICE	1	
42	A41799190QP	HEATER FAN MOTOR	1	NN-C2000P HNE/KKE/KNQ/MNQ/TNE/YNQ NN-C2000W (16W)
42	A41795080BP	HEATER FAN MOTOR	1	NN-C2000P LNK/SNM (35/33.5W)
43	A41804X00AP	HEATER FAN MOTOR BRACKET	1	
44	A601L4780AP	HUMIDITY SENSOR	1	
45	A60304080BP	INCANDESCENT LAMP	1	(20W/240V)
46	A605A4X70QP	THERMISTOR	1	
47	A606Y4V00GP	H.V.INVERTER (U)	1	⚠
48	ANE6142-F60	MICRO SWITCH	2	⚠(V-15G-3C26-1) (PRIMARY)
49	A61425180AP	MICRO SWITCH	2	⚠(L-3C2-2) (SECONDARY)
50	A61456670AP	THERMAL CUTOUT	1	⚠
51	A61524650AP	SOCKET	1	
52	A61785180AP	MICRO SWITCH	2	⚠(L-2C2-2) (SHORT SW)
53	A62304210BP	FUSE	1	⚠(10A/250V)
53	A62304210BP	FUSE	1	⚠(10A/250V)
54	A62314000AP	FUSE HOLDER	1	NN-C2000P
55	A63266660HN	TURNTABLE MOTOR	1	NN-C2000P HNE/KKE/LNK/SNM/TNE (3.3W)
55	A63265850QP	TURNTABLE MOTOR	1	NN-C2000P KNQ/MNQ/YNQ NN-C2000W (2.5W)
56	A6585-1B10	P.C.B.HOLDER A	1	
57	A66036000BP	OVEN LAMP BRACKET	1	
58	A6662-1880	EARTH SPACER	1	
59	A67634X00AP	P.C.B.HOLDER B	1	
60	A67974X00CP	P.C.B.HOLDER C	1	NN-C2000W
61	A692Y4T00QP	NOISE FILTER (U)	1	NN-C2000W
62	A900C6660HN	AC CORD W/PLUG	1	⚠NN-C2000P HNE (220-240V)
62	A900C5450MK	AC CORD W/PLUG	1	⚠NN-C2000P KKE/KNQ/MNQ/YNQ (220-240V)
62	A900C6240CP	AC CORD W/PLUG	1	⚠NN-C2000P LNK (230-240V)
62	A900C9770SN	AC CORD W/PLUG	1	⚠NN-C2000P SNM (220-240V)
62	A900C5450TN	AC CORD W/PLUG	1	⚠NN-C2000P TNE (220V)
62	A900C6660JP	AC CORD W/PLUG	1	⚠NN-C2000W (240V)
63	XST4+5VS	SCREW	1	4X5 (FOR COVER)
64	XTT4+8RDN	SCREW	1	4X8 (FOR CABINET BODY)
65	XTWANE3+ 10S4	SCREW	1	3X10 (FOR LAMP SOCKET)
66	XTWANE4+ 10RU	SCREW	4	4X10 (FOR MAGNETRON)
66	XTWANE4+ 10RU	SCREW	4	4X10 (FOR MAGNETRON)
67	XTWA3+8CF	SCREW	1	3X8 (FOR INVERTER EARTH)
68	XTW3+18B	SCREW	4	
69	XYD4+EE12F	SCREW	1	4X12 (FOR EARTH)
70	2M236-M1G	MAGNETRON	1	⚠
71	ANE6501-C41	HEATER HOLDER C	2	
72	XWS4VL	WASHER	2	
73	A21446660QP	UPPER PANEL	1	

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
74	A21776660QP	WASHER	1	
75	A22784X00AP	UPPER HEATER PANEL	1	
76	A41325020AQ	PULLEY B	1	
77	A41575450AP	FAN BRACKET A	1	
78	A41585450AP	FAN BRACKET B	1	
79	A41635020AQ	FAN SPACER C	1	
80	A400S6660QP	SHAFT U	1	
81	A630G6660QP	HEATER A	1	NN-C2000P MNQ/YNQ/KNQ NN-C2000W QPQ
81	A630G6660HN	HEATER A	1	NN-C2000P HNE/LNK/TNE/SNM/KKE
81	A630G6660JP	HEATER A	1	NN-C2000W JPG
82	A64175130AP	HEATER SUPPORT	3	
82	A64175130AP	HEATER SUPPORT	3	
82	A64175130AP	HEATER SUPPORT	3	
83	XTWANE35+ 14N	SCREW	3	3.5X14 (FOR HEATER SUPPORT)
83	XTWANE35+ 14N	SCREW	3	3.5X14 (FOR HEATER SUPPORT)
84	XNG4EVS	NUT	2	
84	XNG4EVS	NUT	2	
85	XWS4VL	WASHER	2	
85	XWS4VL	WASHER	2	
86	A01574X70HN	NAME LABEL	1	NN-C2000P HNE
86	A01574X70KK	NAME LABEL	1	NN-C2000P KKE
86	A01574X70KN	NAME LABEL	1	NN-C2000P KNQ
86	A01574X70LN	NAME LABEL	1	NN-C2000P LNK
86	A01574X70MN	NAME LABEL	1	NN-C2000P MNQ
86	A01574X70SN	NAME LABEL	1	NN-C2000P SNM
86	A01574X70TN	NAME LABEL	1	NN-C2000P TNE
86	A01574X70YN	NAME LABEL	1	NN-C2000P YNQ
86	A01574X70QP	NAME LABEL	1	NN-C2000P QPQ
86	A01574X70JP	NAME LABEL	1	NN-C2000P JPG
87	A02444X70QP	CAUTION LABEL	1	
88	A09254X70QP	CUSHION RUBBER C	1	
89	ANE0922000AQ	CUSHION RUBBER C	1	

15. DOOR ASSEMBLY

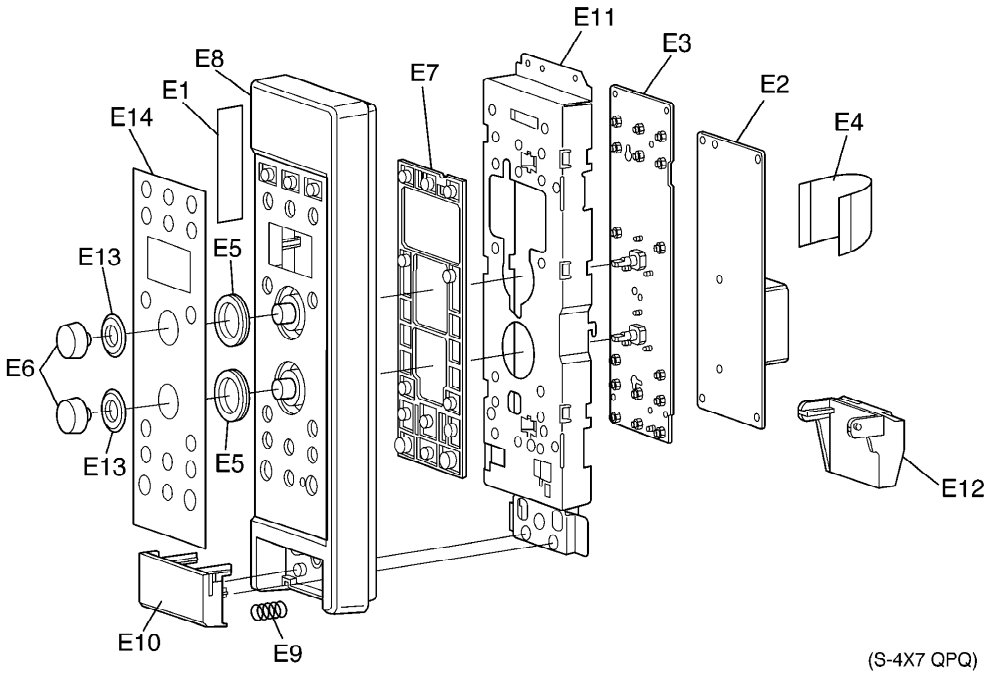


(S-4X7 QPQ)

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
D1	ANE0245X00AP	DHHS LABEL	1	NN-C2000P LNK
D1	A01726210JP	CAUTION LABEL	1	NN-C2000W JPG
D2	XTBANE4+ 12FK	SCREW	4	4X12(FOR DOOR C)
D2	XTBANE4+ 12FK	SCREW	4	4X12(FOR DOOR C)
D3	A300B5450AP	UPPER HINGE	1	⚠
D4	A302K6660QP	DOOR E(U)	1	⚠
D5	A30186660QP	DOOR KEY A	1	
D6	A30214000AP	DOOR KEY SPRING	1	
D7	A30856660QP	DOOR C	1	⚠
D8	A302A4X70GMN	DOOR A (U)	1	NN-C2000P HNE/LNK/MNQ/TNE/YNQ (NOTE 1)
D8	A302A4X70GKN	DOOR A (U)	1	NN-C2000P KKE/KNQ/SNM (NOTE 1)
D8	A302A4X70HQP	DOOR A (U)	1	NN-C2000W QPQ (NOTE 1)

NOTE 1: Please order DHHS LABEL or CAUTION LABEL together.

16. ESCUTCHEON BASE ASSEMBLY

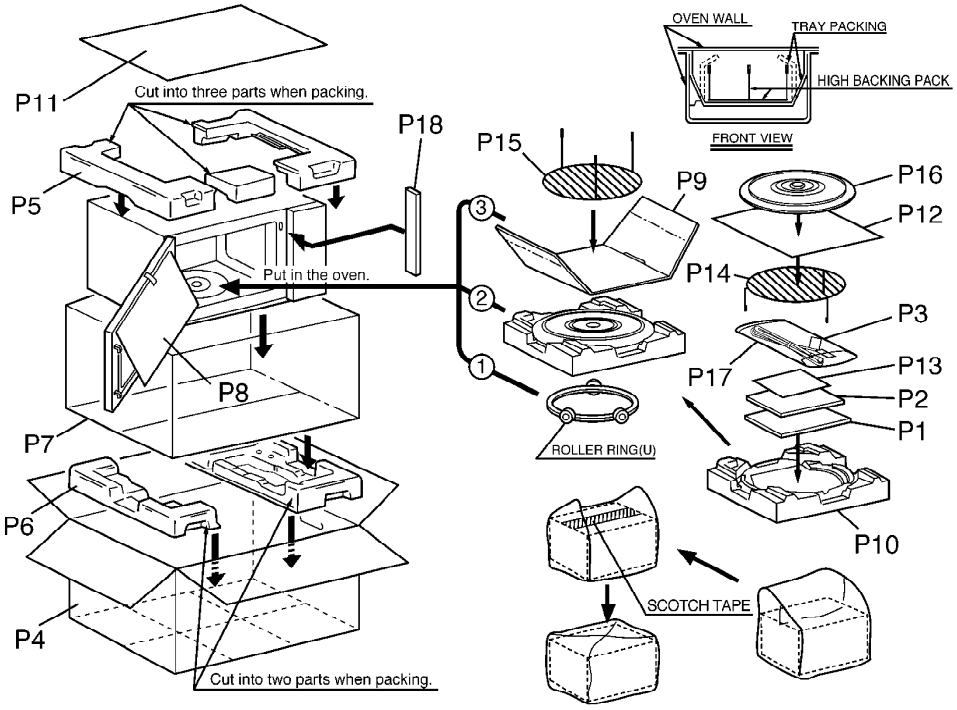


(S-4X7 QPQ)

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
E1	A02840000MK	NUMBER LABEL	1	NN-C2000P YNQ
E2	A603Y4X70QP	PC BOARD D (U)	1	NN-C2000P NN-C2000W QPQ
E3	A605Q4X70HN	PC BOARD F (U)	1	NN-C2000P HNE (W/COMPONENT)
E3	A605Q4X70SN	PC BOARD F (U)	1	NN-C2000P KKE/SNM (W/COMPONENT)
E3	A605Q4X70KN	PC BOARD F (U)	1	NN-C2000P KNQ (W/COMPONENT)
E3	A605Q4X70LN	PC BOARD F (U)	1	NN-C2000P LNK (W/COMPONENT)
E3	A605Q4X70MN	PC BOARD F (U)	1	NN-C2000P MNQ (W/COMPONENT)
E3	A605Q4X70TN	PC BOARD F (U)	1	NN-C2000P TNE (W/COMPONENT)
E3	A605Q4X70YN	PC BOARD F (U)	1	NN-C2000P YNQ (W/COMPONENT)
E3	A605Q4X70QP	PC BOARD F (U)	1	NN-C2000W QPQ (W/COMPONENT)
E3	A605Q4X70JP	PC BOARD F (U)	1	NN-C2000W JPG (W/COMPONENT)
E4	A6590-3280	FLAT CABLE	1	
E5	A80094X70QP	INDICATOR A	1	
E5	A80094X70QP	INDICATOR A	1	
E6	A80204X70QP	TIMER KNOB	2	
E7	A80244X70QP	OPERATION BUTTON	1	
E8	A80344X70GMN	ESCUTCHEON BASE	1	NN-C2000P (NOTE 2)
E8	A80344X70HQP	ESCUTCHEON BASE	1	NN-C2000W (NOTE 2)
E9	ANE80378A0AG	SPRING	1	
E10	A80724X70GMN	DOOR OPENING BUTTON	1	NN-C2000P
E10	A80724X70HQP	DOOR OPENING BUTTON	1	NN-C2000W
E11	A81274X70QP	BACK PANEL	1	
E12	A82569770AP	DOOR OPENING LEVER	1	
E13	A82874X70QP	SPACER A	2	
E13	A82874X70QP	SPACER A	2	
E14	A83374X70GMN	ESCUTCHEON SHEET	1	NN-C2000P HNE/LNK/MNQ/TNE/YNQ
E14	A83374X70GKN	ESCUTCHEON SHEET	1	NN-C2000P KKE/KNQ/SNM
E14	A83374X70HQP	ESCUTCHEON SHEET	1	NN-C2000W

NOTE 2: Please order NUMBER LABEL together.

17. PACKING AND ACCESORIES

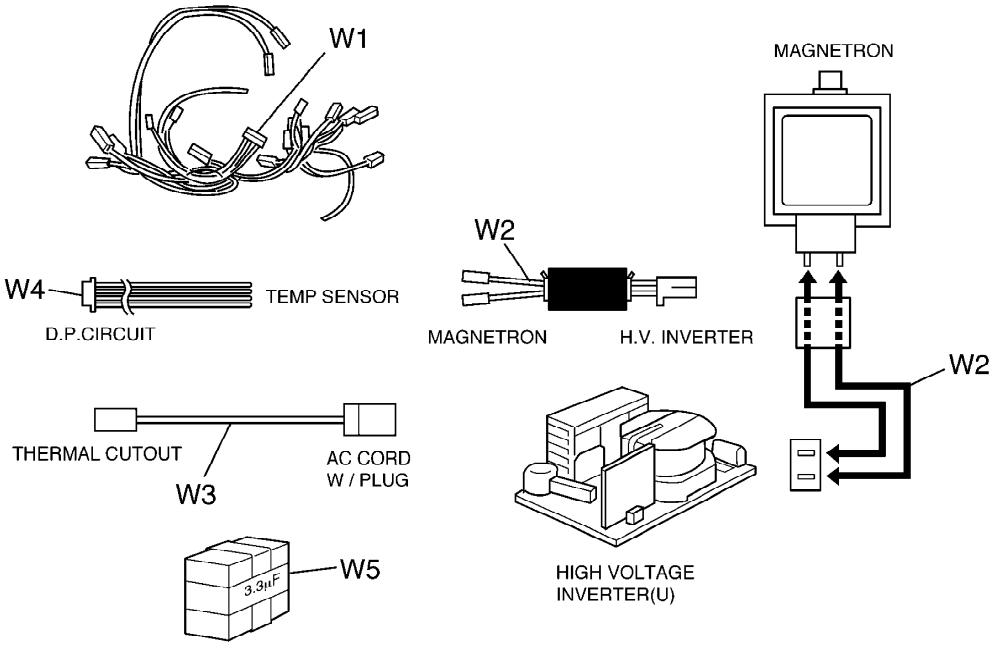


(S-4X7 QPQ)

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
P1	A000B4X70MN	COOK BOOK	1	NN-C2000P HNE/LNK/MNQ/TNE/YNQ
P1	A000B5820KN	COOK BOOK	1	NN-C2000P KKE/KNQ/SNM
P2	A00034X70HN	INSTRUCTION BOOK	1	NN-C2000P HNE/LNK/MNQ/TNE/YNQ
P2	A00034X70KN	INSTRUCTION BOOK	1	NN-C2000P KKE/KNQ/SNM
P2	A00034X70QP	INSTRUCTION BOOK	1	NN-C2000W
P3	A00324040XN	EARTH CAUTION LABEL	1	NN-C2000P TNE
P4	A01024X70HMN	PACKING CASE PAPER	1	NN-C2000P HNE/LNK/MNQ/TNE/YNQ
P4	A01024X70HKN	PACKING CASE PAPER	1	NN-C2000P KKE/KNQ/SNM
P4	A01024X70HQP	PACKING CASE PAPER	1	NN-C2000W QPQ
P4	A01024X70HJP	PACKING CASE PAPER	1	NN-C2000W JPG
P5	A01046660MN	UPPER FILLER	1	NN-C2000P HNE/LNK/MNQ/TNE/YNQ
P5	A01046660KN	UPPERFILLER	1	NN-C2000P KKE/KNQ/SNM
P5	A01046660QP	UPPER FILLER	1	NN-C2000W
P6	A01056660MN	LOWER FILLER	1	NN-C2000P HNE/LNK/MNQ/TNE/YNQ
P6	A01056660KN	LOWER FILLER	1	NN-C2000P KKE/KNQ/SNM
P6	A01056660QP	LOWER FILLER	1	NN-C2000W
P7	A01065130AP	VINYL COVER	1	
P8	ANE0107580AP	DOOR SHEET	1	
P9	A01086660QP	TRAY PACKING	1	
P10	A01136660QP	TRAY STYROL	1	
P11	A01265820HKN	REINFORCE MATERIAL	1	NN-C2000P KKE/KNQ/SNM
P12	ANE02072L0AP	STYROL SHEET	1	
P13	A04454X70MN	MENU LABEL	1	NN-C2000P MNQ
P14	A060V4X00AP	HIGH BAKING RACK	1	MID(50MM)
P15	A060V4X00CP	HIGH BAKING RACK	1	HIGH(135MM)

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
P16	A06014X70QP	COOKING TRAY	1	
P17	A91644000XN	EARTH LEAD	1	NN-C2000P TNE
P18	A01459770KN	DOOR SHEET B	1	

18. WIRING MATERIAL

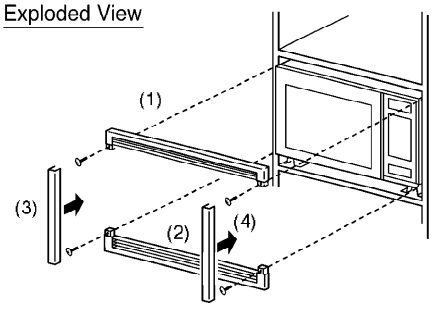


(S-4X7 QPQ)

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
W1	A030A4X70MN	LEAD WIRE HARNESS	1	NN-C2000P
W1	A030A4X70QP	LEAD WIRE HARNESS	1	NN-C2000W
W2	A030E4X00AP	LEAD WIRE	1	NN-C2000P
W2	A030E4X00CP	LEAD WIRE	1	NN-C2000W
W3	A03509770LN	LEAD WIRE	1	NN-C2000P LNK
W4	A03536660QP	LEAD WIRE	1	
W5	AECQJ5335KRP	CAPACITOR	1	3.3MF

PARTS LIST FOR MICROWAVE OVEN TRIM KITS

Exploded View



Trim Kit Model No.	Top and Bottom Strip Ref No:1.2	Pcs/ Set	Side Strip Ref No:3.4	Pcs/ Set	Microwave Oven Model No.
NN-TK953	A1603A000HAG	2	A1601A240HAP	2	NN-C2000W

NOTE. The top and bottom strips have the same part number and the left and right side strips also have the same part number. These parts will be supplied on one piece per one part number.

19. REF. NO. 47 H. V. INVERTER (U)

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
	2SA1175TFK	TRANSISTOR SI 0.25W	1	
	2SC2785TFK	TRANSISTOR SI 0.25W	2	
C701	ECWF5104N300	FILM CAPACITOR	1	0.1MF 500VDC
C702	ECQE2405T847	POLYESTER CAPACITOR	1	4MF 250VDC
C703	ECWF5454N300	FILM CAPACITOR	1	0.45MF 500VDC
C704 705	ECWH30822JUA	FILMCAPACITOR	2	8200PF 3KVDC
CN701	AEEMXH00703G	CONNECTOR	1	
CT701	A66904T00AP	TRANSFORMER	1	
D701 702	A6202-4N10T	DIODE SI 0.3A	2	⚠
D703	AEDNERA3806	DIODE SI 0.5A	1	ERA38-06
D704 705	AEDNERA1506	DIODE SI 1A	2	ERA1506
D706	MA196-(TA5)	DIODE SI 0.1A	1	MA196
DB701	AESTRBV6206	DIODE SI 15A	1	15A 600V
DB701	XTW3+12B	SCREW	2	3X12 (FOR Q701)
H.S.	A66914T00AP	HEAT SINK	1	
IC702 703	AEICP25011HL	IC	2	PS2501-1 HL 4P
IC801	AN9DB07SB	IC	1	
L701	A50204T00AP	COIL	1	
Q701	AESCGT60M303	TRANSISTOR SI 170W	1	
Q702	AESPGT30J322	TRANSISTOR SI 75W	1	GT30J322
Q702	XTN3+12B	SCREW	1	3X12 (FOR Q702)
Q703 704	2SC3311AQSTA	TRANSISTOR SI	2	2SC3311AQRS
Q705	2SA1309AQSTA	TRANSISTOR SI	1	2SA1309AQRS
R701	AERG419S107M		1	
R715	AERGS215J452	RESISTOR	1	4.5K Ω 15W
T701	A609A4V00GP	INERTER TRANS.	1	P20T S296T
VR701	AEVTZ6TLT102	VARIABLE RESISTOR	1	1K Ω 30%
ZD701 703 704 705	AEDZ10ES2T1	ZENNER DIODE SI	4	RD10ES2T1
ZD702	AESZ12JS2T1	ZENNER DIODE SI	1	RD12JS2

20. REF NO. E2 P. C. BOARD D (U)

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
BZ210	AEFB22EP20TL	BUZZER	1	2.0KHZ
C10	ECA1HM102E	ELECTROLYTIC CAPACITOR AL	1	1000MF/50V
C12 13 220	AECF50F104Z	CERAMIC CAPACITOR	3	0.1MF/50V
C14	ECA1HM101B	ELECTROLYTIC CAPACITOR AL	1	
C330 502	ECBT1E103ZF5	CERAMIC CAPACITOR	2	0.01MF/25V
C500	ECEA1HKA010B	ELECTROLYTIC CAPACITOR AL	1	1MF/50V
C501	ECSF1VE6842B	ALUMINIUM CAPACITOR	1	0.68MF/35V
CN1	AEEMMD15509W	CONNECTOR	1	9 PIN WHITE
CN2	AEEMMF01D05W	CONNECTOR	1	5 PIN
CN3	AEEMXF00703B	CONNECTOR	1	3 PIN BLUE
CN4	AEEMMF00D04W	CONNECTOR	1	4 PIN
CN5	AEEMHLEM21S	CONNECTOR	1	3 PIN RED
CN6	AEEMMF00703R	CONNECTOR	1	
D10 11 220	AEDNERA1502	DIODE SI 1A	3	
D25	ERZV10D511CS	VARISTOR	1	V10511U
D26 27	ERZV10D112C1	VARISTOR	2	V10112U
D221 222	AESS133T-77	DIODE SI 0.1A	2	
D500	AESM05DSMM5A	TRIAC 5A	1	
F1	A62309770AP	FUSE 0.8A	1	⚠
Q10	A6244UE1625	HEAT SINK	1	
Q10	XYN3+F8S6	SCREW	1	3X8
Q10	2SD2012	TRANSISTOR SI 2W	1	2SD2012
Q220	AESAKTA200Y	TRANSISTOR SI 0.6W	1	
Q500 502	2SC2785TFK	TRANSISTOR SI 0.25W	2	2SC2785TFEK
Q501	AESC14EST	TRANSISTOR SI 0.3W	1	
Q502	AESC23JST	TRANSISTOR SI 0.3W	1	
R10 12 210	ERDS2TJ102T	CARBON FILM RESISTOR	3	1.0K Ω 1/4W 5%
R13 14 15 222	ERDS2TJ104T	CARBON FILM RESISTOR	4	100K Ω 1/4W 5%
R211	ERDS2TJ332T	CARBON FILM RESISTOR	1	3.3K Ω 1/4W 5%
R220 511	ERDS2TJ103T	CARBON FILM RESISTOR	2	10K Ω 1/4W 5%
R221 230	ERDS2TJ242T	CARBON FILM RESISTOR	2	2.4K Ω 1/4W 5%
R223 224 225 226	ERDS2TJ820T	CARBON FILM RESISTOR	4	82 Ω 1/4W 5%
R227 228 229	ERDS2TJ301T	CARBON FILM RESISTOR	3	300 Ω 1/4W 5%
R330 521	ERDS2TJ333T	CARBON FILM RESISTOR	2	33K Ω 1/4W 5%
R500 501 502 503	ERDS2TJ221T	CARBON FILM RESISTOR	4	220 Ω 1/4W 5%
R504 505	ERDS2TJ751T	CARBON FILM RESISTOR	2	750 Ω 1/4W 5%

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
R506	ERDS2TJ512T	CARBON FILM RESISTOR	1	5.1K Ω 1/4W 5%
R507	ERDS2TJ153T	CARBON FILM RESISTOR	1	15K Ω 1/4W 5%
R508	ERDS2TJ223T	CARBON FILM RESISTOR	1	22K Ω 1/4W 5%
R509	ERDS2TJ105T	CARBON FILM RESISTOR	1	1M Ω 1/4W 5%
RY1 7	AEGG5G1A18	POWER RELAY	2	⚠G5G-1A-ER18
RY2 5 6	AEBGG5N1A18	POWER RELAY	3	⚠
T10	ETP48SFC93EP	L.V.TRANSFORMER	1	
ZD10	AEDZ5R6ES2T1	ZENNER DIODE SI	1	RD5.6ES2
ZD11	AEDZ4R7ES3T1	ZENNER DIODE SI	1	RD4.7ES3
ZD501	AEDZ4R3ES3T1	ZENNER DIODE SI	1	RD4.3ES3

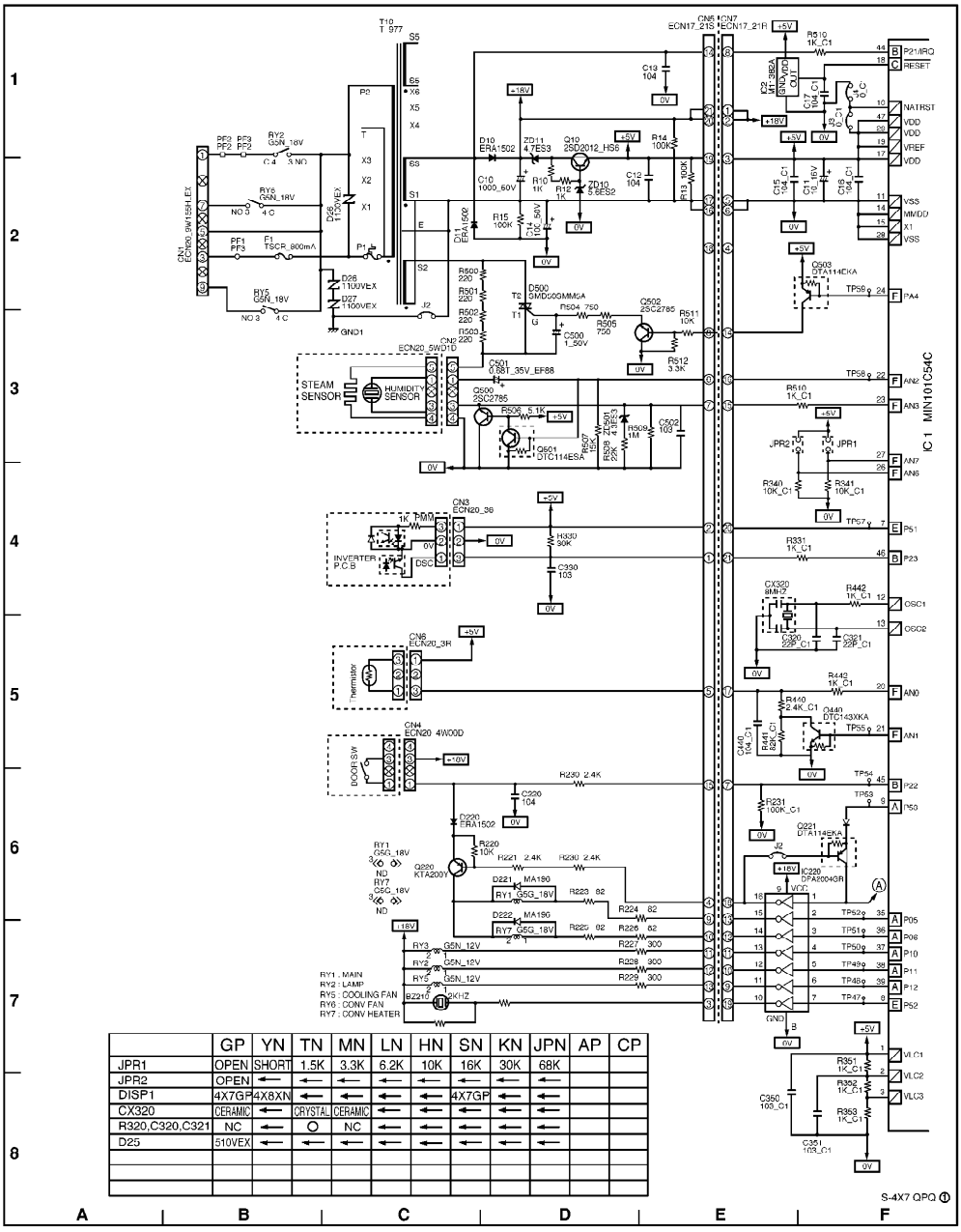
21. REF NO. E3 P. C. BOARD F (U)

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
C11	ECEA1CKA100B	ELECTROLYTIC CAPACITOR AL	1	10MF/16V
C15 16 17 440	AECU1F104Z25	CERAMIC CAPACITOR	4	0.1MF/25V
C40	AECU1C101J50	CERAMIC CAPACITOR	1	0.0001MF/50V
C80 81 82 83 350 351	AECU1F103Z50	CERAMIC CAPACITOR	6	0.01MF/50V
C320 321	AECU1C270J50	CERAMIC CAPACITOR	2	NN-C2000P TNE
CN7	AEEMHLEM20R	CONNECTOR	1	
CX320	EFOEC8004T4	RESONATOR	1	NN-C2000P HNE/KKE/ KNQ/LNK/MNQ/SNM/ YNQ 8MHZ
CX320	AEYXAT49-8MA	RESONATOR	1	NN-C2000P TNE
D40 41 223	AESS133T-77	DIODE SI 0.1A	3	1SS133T
D180 181 182 183 184 185 186 187 188	AESQTLGE260T	LED	9	
D189	AESQSEL4414E	LED	1	SEL4414ETP5
DISP110	AEDDHLC4X8XN	DISPLAY (LCD)	1	NN-C2000P HNE/LNK/ MNQ/TNE/YNQ
DISP110	AEDDHLC4X7QP	DISPLAY (LCD)	1	NN-C2000P KKE/KNQ/ SNM NN-C2000W QPQ/ JPQ
HOLDER	A611A4J00XN	DISPLAY HOLDER	1	
IC1	MN101C54CDD	IC	1	MN101C54C
IC220	AEICU2004GR2	IC	1	A2004G
JPR1	ERDS2TJ103T	CARBON FILM RESISTOR	1	NN-C2000P HNE 10K Ω 1/ 4W 5%
JPR1	ERDS2TJ163T	CARBON FILM RESISTOR	1	NN-C2000P KKE/SNM 16K Ω 1/4W 5%

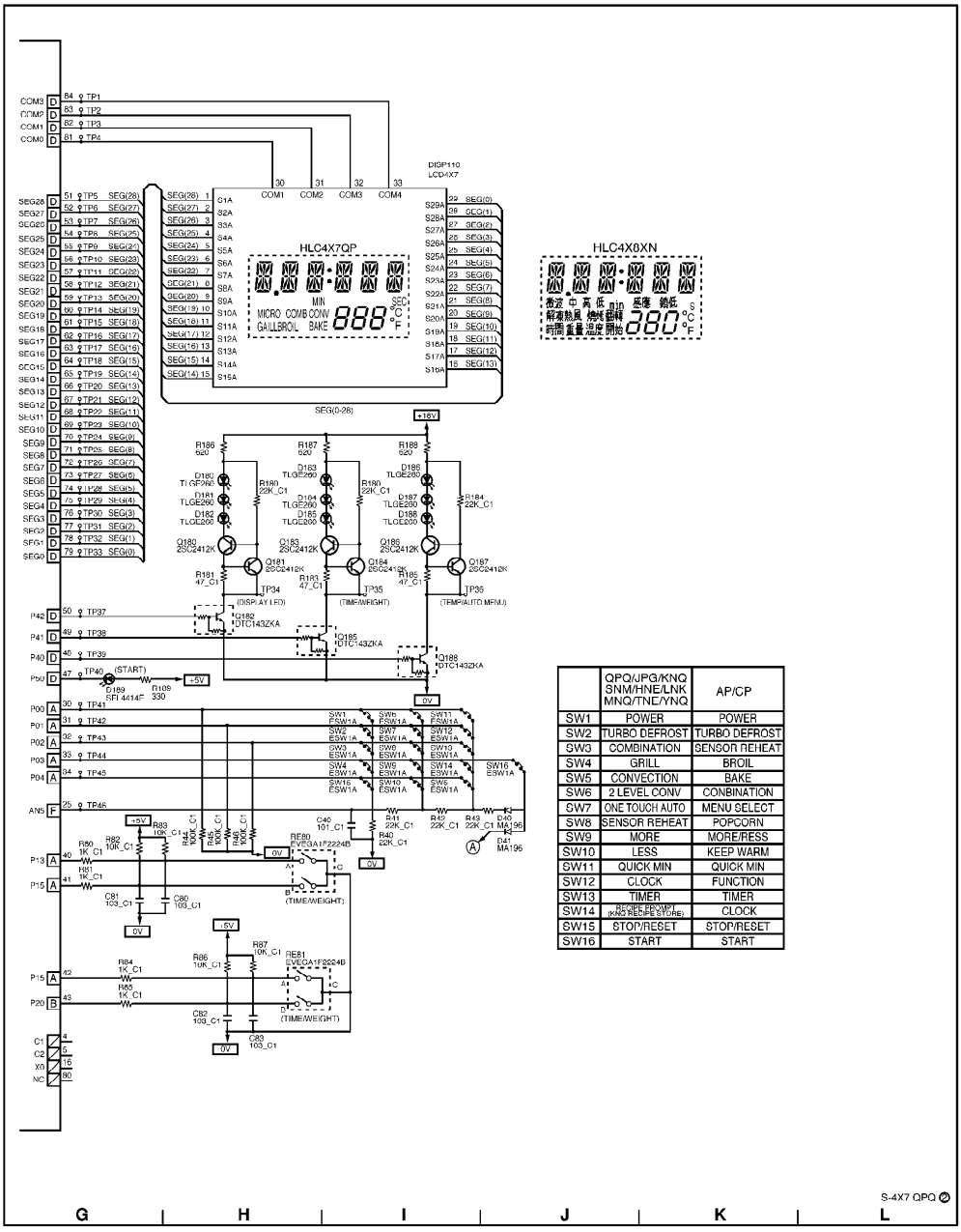
Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
JPR1	ERDS2TJ303T	CARBON FILM RESISTOR	1	NN-C2000P KNQ 30K Ω 1 /4W 5%
JPR1	ERDS2TJ622T	CARBON FILM RESISTOR	1	NN-C2000P LNK 6.2K Ω 1 /4W 5%
JPR1	ERDS2TJ332T	CARBON FILM RESISTOR	1	NN-C2000P MNQ 3.3K Ω 1/4W 5%
JPR1	ERDS2TJ152T	CARBON FILM RESISTOR	1	NN-C2000P TNE 1.5K Ω 1 /4W 5%
JPR1	ERDS2TJ683T	CARBON FILM RESISTOR	1	NN-C2000P JPG 68K Ω 1/ 4W 5%
Q180 183 186	2SD1859TV2Q	TRANSISTOR SI 1W	3	2SD1859TV QR120MHZ
Q181 184 187	2SC2412KT146	TRANSISTOR SI 0.2W	3	2SC2412K180MHZ
Q182 185 188	AESC43ZKE	TRANSISTOR SI 0.3W	3	DTC143ZKA/E23 100MHZ
Q221 503	AESA14EKE	TRANSISTOR SI 0.2W	2	DTA114EKA/14
Q440	AESC43XKE	TRANSISTOR SI 0.3W	1	DTC143XKA/43100MHZ
R11 231	AERJ3GSYJ104	RESISTOR	2	100K Ω 1/16W 5%
R40	AERJ3GSYJ123	RESISTOR	1	12K Ω 1/16 5%
R41 440	ERJ3GSYJ242	RESISTOR	2	2.4K Ω 1/16W 5%
R42	AERJ3GSYJ472	RESISTOR	1	4.7K Ω 1/16W 5%
R43 180 182 184	AERJ3GSYJ223	RESISTOR	4	22K Ω 1/16 5%
R80 81 84 85 331 442 510	AERJ3GSYJ102	RESISTOR	7	1K Ω 1/16W 5%
R82 83 86 87 340 341	AERJ3GSYJ103	RESISTOR	6	10K Ω 1/16W 5%
R181	AERJ3GSYJ470	RESISTOR	3	47 Ω 1/16W 5%
R186 187 188	ERDS2TJ621T	CARBON FILM RESISTOR	3	620 Ω 1/4W 5%
R189	ERDS2TJ331T	CARBON FILM RESISTOR	1	330 Ω 1/4W 5%
R320	AERJ3GSYJ000	RESISTOR	1	NN-C2000P TNE 1M Ω 1/ 16W 5%
R441	AERJ3GSYJ823	RESISTOR	1	82K Ω 1/16W 5%
RE80 81	EVEGA1F2224B	ROTARY ENCODER	2	EVEGA1F2224B
SW1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	EVQ11L05R	SWITCH	16	EVQ21505R
R183 185	AERJ3GSYJ750	RESISTOR	2	75 Ω 1/16W 5%

22. DIGITAL PROGRAMMER CIRCUIT

SCHEMATIC DIAGRAM



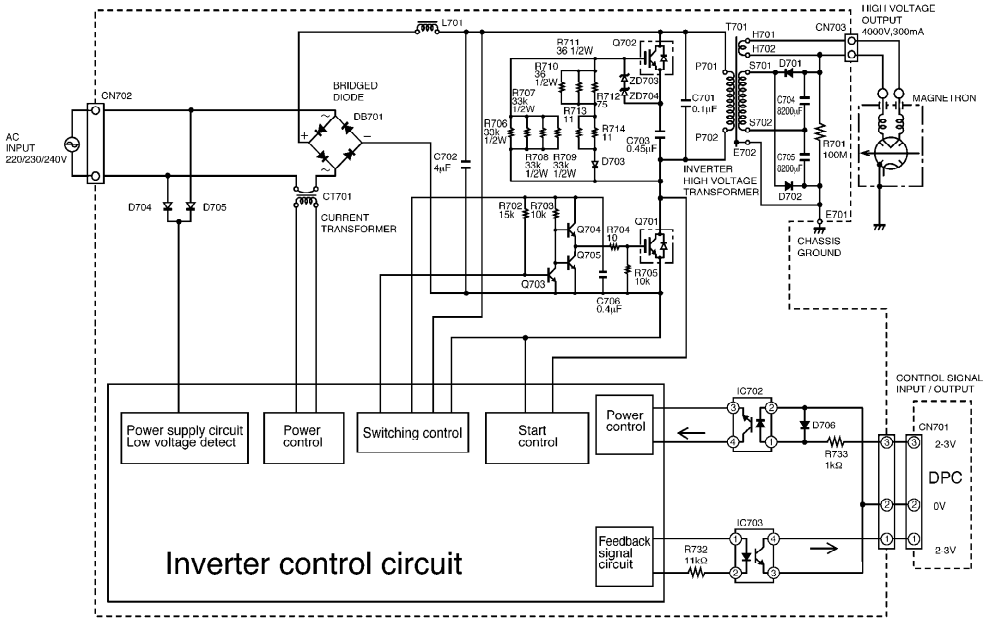
	GP	YN	TN	MN	LN	HN	SN	KN	JPN	AP	CP
JPR1	OPEN	SHORT	1.5K	3.3K	6.2K	10K	16K	30K	68K		
JPR2	OPEN	←	←	←	←	←	←	←	←		
DISP1	4X7GP	4X8XN	←	←	←	←	4X7GP	←	←		
CX320	CERAMIC	←	CRYSTAL	CERAMIC	←	←	←	←	←		
R320,C320,C321	NC	←	○	NC	←	←	←	←	←		
D25	510VEX	←	←	←	←	←	←	←	←		



	QPQ/JPG/KNQ SNM/HNE/LNK MNQ/TNE/YNQ	AP/CP
SW1	POWER	POWER
SW2	TURBO DEFROST	TURBO DEFROST
SW3	COMBINATION	SENSOR REHEAT
SW4	GRILL	BROIL
SW5	CONVECTION	BAKE
SW6	2 LEVEL CONV	CONBINATION
SW7	ONE TOUCH AUTO	MENU SELECT
SW8	SENSOR REHEAT	POPCORN
SW9	MORE	MORE/RESS
SW10	LESS	KEEP WARM
SW11	QUICK MIN	QUICK MIN
SW12	CLOCK	FUNCTION
SW13	TIMER	TIMER
SW14	RECIPE PROMPT (KNQ RECIPE STORE)	CLOCK
SW15	STOP/RESET	STOP/RESET
SW16	START	START

23. INVERTER CIRCUIT

SCHEMATIC DIAGRAM


HIGH VOLTAGE OUTPUT 4000V,300mA
L701
T701
CN703
H701
H702
S701
D701
P701
CN702
BRIDGED DIODE
DB701
AC INPUT 220/230/240V
R711 36 1/2W
Q702
R710 36 1/2W
2D703
R707 33k 1/2W
R712 75
2D704
C701 0.1μF
C704 8200pF
MAGNETRON
R713 11
R706 33k 1/2W
R714 11
C703 0.45μF
P702
S702
E702
R701 100M
C705 8200pF
R708 33k 1/2W
R709 33k 1/2W
D703
C702 4μF
INVERTER HIGH VOLTAGE TRANSFORMER
D702
E701
D704
D705
C1701
CURRENT TRANSFORMER
R702 15k
R703 10k
Q704
R704 10
Q701
CHASSIS GROUND
Q705
Q703
R705 10k
C706 0.4μF
CONTROL SIGNAL INPUT / OUTPUT
IC702
Power supply circuit Low voltage detect
Power control
Switching control
Start control
Power control
D706
R733 1kΩ
CN701
2-3V
DPC
0V
2.3V
IC703
Feedback signal circuit
R732 11kΩ
Inverter control circuit